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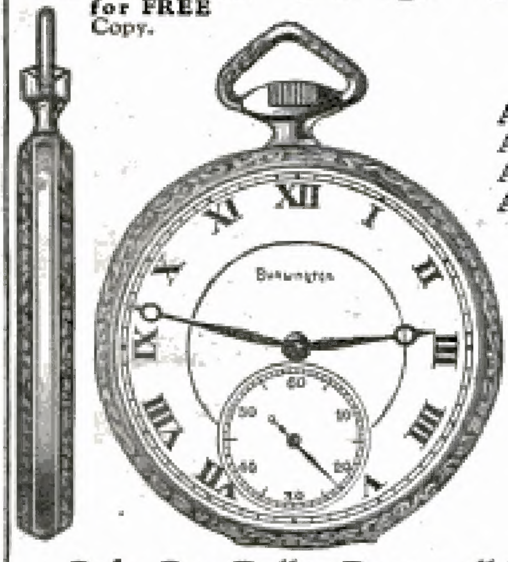

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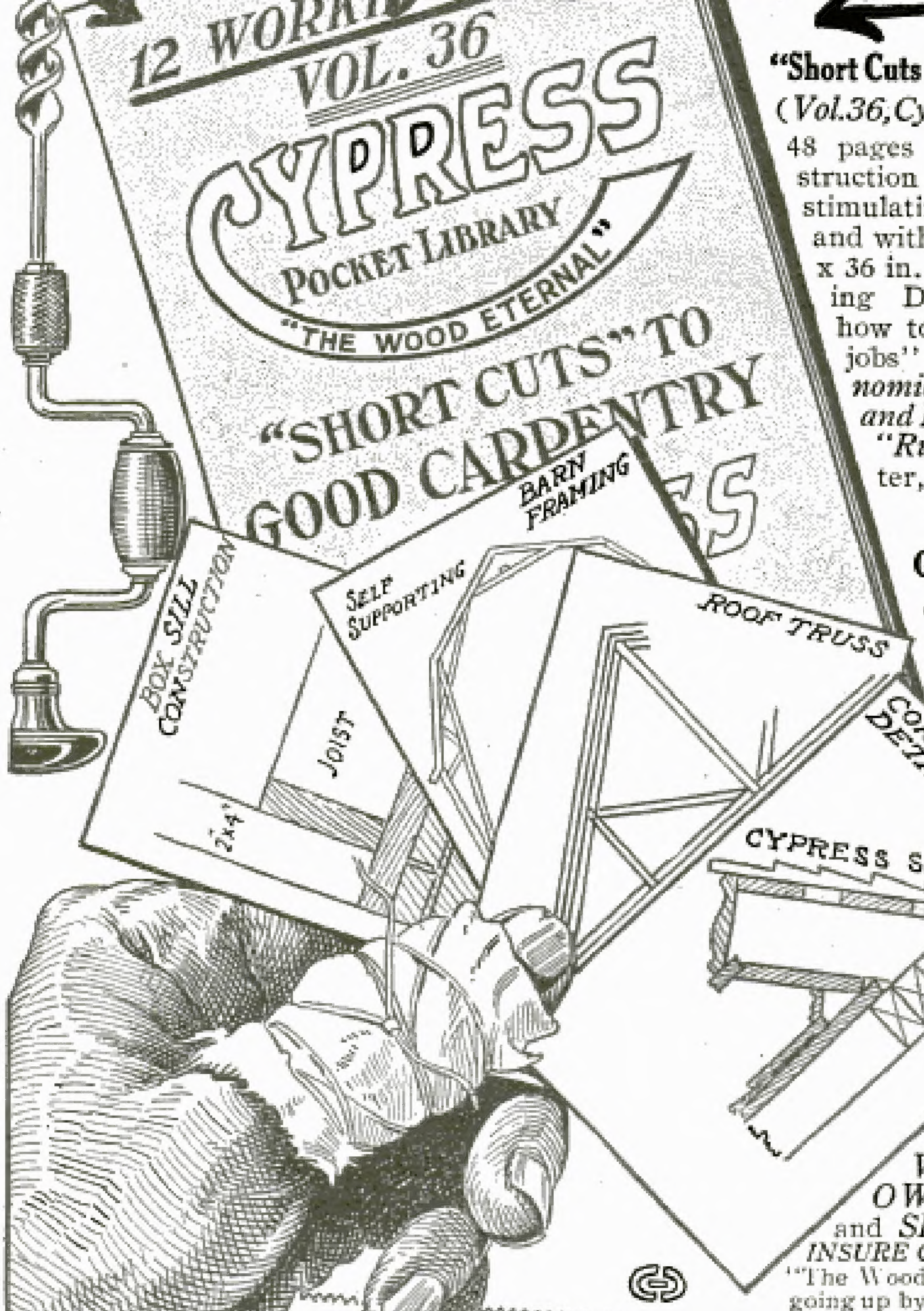

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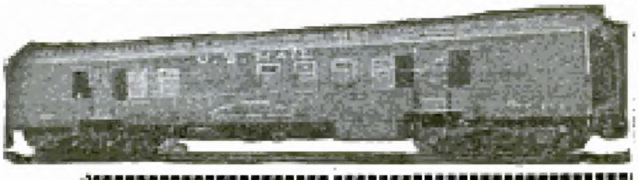

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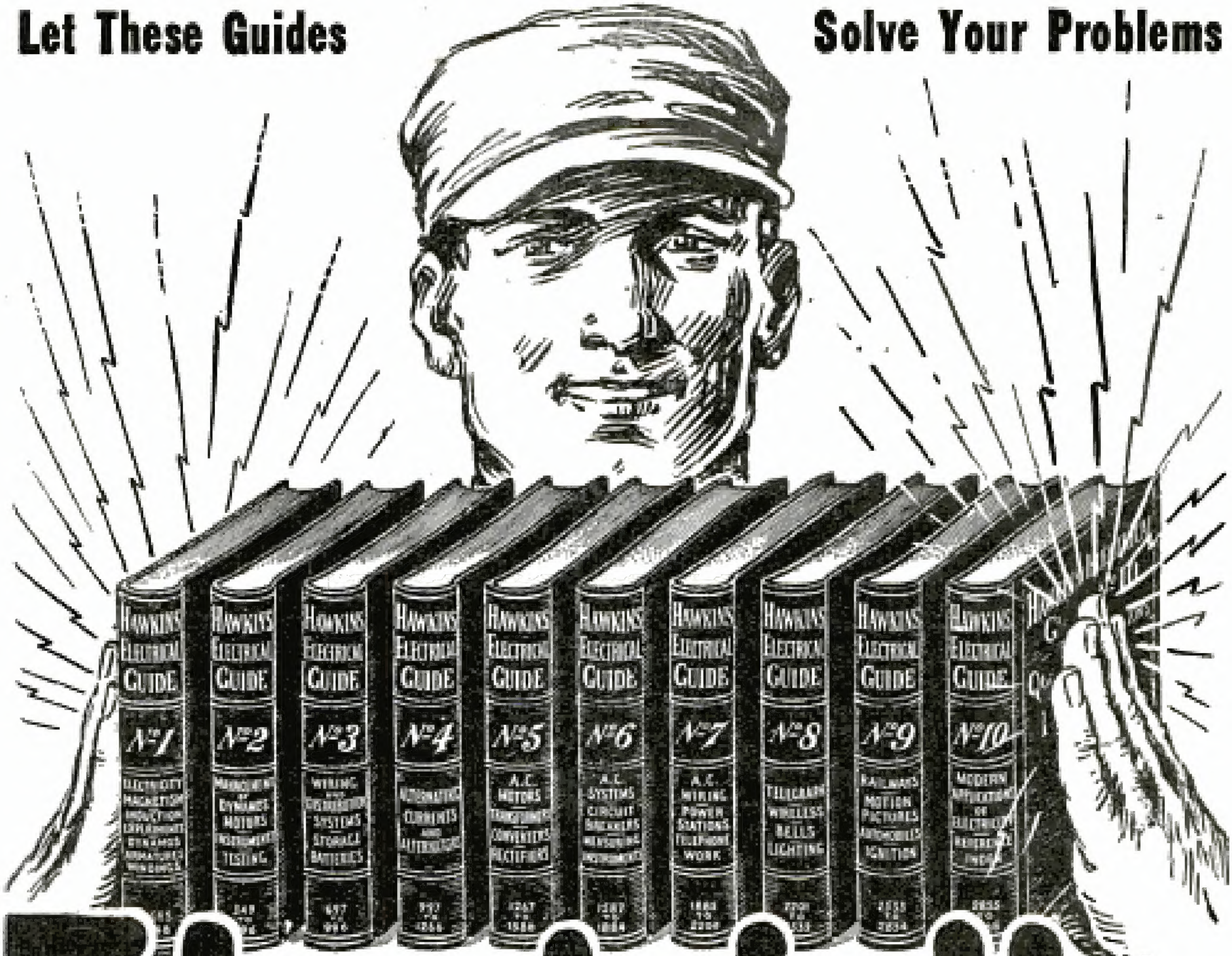

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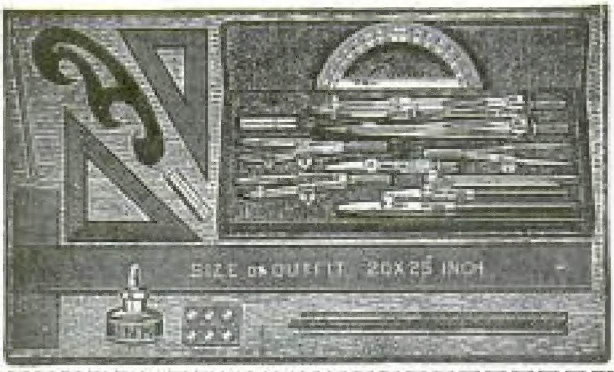

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Now look at No. 2. This Buddie decided to investigate the auto-motive business. He wanted to see if it did not offer him wonderful possibilities. He believed the trained man could succeed; he was curious and eager to know more about the amazing Sweeney System, so he answered the advertisement. He just sent me his name and the day I got his letter, I sent him the big 64-page Sweeney catalog. You see him now reading the Sweeney catalog. This is the most important step of all—the first step—to get the catalog. This man is reading how 60,000 men made good, how they learned to be expert mechanics. He is reading how Wilson and Powell left the Sweeney School and now "wouldn't take $10,000 for our business, and we owe it to you." How Elbert Pence built up a $25,000 yearly garage business at Clearmont, Missouri; how men are trained in eight weeks to be competent repairmen, auto and tractor experts, mechanics, garage owners, salesmen, etc.; how the wonderful Sweeney System as applied with the immense resources of this Million Dollar School teaches them by training hand and eye and brain; how everything is here not only to teach them, but to make them comfortable, dormitories, swimming pools, free lockers, reading rooms, one of the finest equipped trade schools in the world. Now I want you to get the catalog and see the actual pictures of men at work in the school.

Reading the fascinating Sweeney catalog

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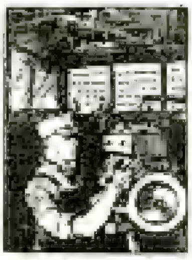
At work in the Sweeney School

Now I call your attention to picture Number 4. This young man has completed his course and decided to go to work right away. He took a job as a repairman at $1.25 per hour. There are plenty of better jobs open. The demand for trained men is way in excess of the supply. Sweeney graduates are eligible to positions as motor experts, $125.00 a month; chauffeurs, $150.00 a month; trouble shooters, $3.00 per hour; tractor engineers, $15.00 a day; demonstrators, $150.00 a month; salesmen, $3,500.00 a year; garage managers, $3,000.00 a year.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Some men go back home and open their own repair business; some go to work in the big garages; some have a variety of plans, but all practical, and I'm glad to talk over and advise with my students, if they are in doubt. But don't forget this: "Trained men command the good jobs."

Please look at Picture Number 5. It shows my student in business for himself. He has opened his own shop and garage. He has a business that will fix him for life. He is on mighty good terms with the banker, the president of the local commercial club, all the successful men in his town.

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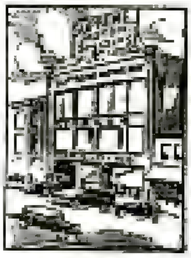
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by C.L.Hardy

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"And by and by we got to noticing that Billy Stevens was getting ahead of some of us old fellows who had been around here for years.

"I can remember as clearly as though it were yesterday, the day Billy showed old Tom Harvey how to figure out the pitch of some new bevel gears we were making on an important contract.

"Tom told me afterward how respectful Billy was—nothing fresh, or 'I know it all' about him. He just made a suggestion and showed Tom a quicker way to start the problem and a shorter, surer way to finish it.

"One day I said to him—'Where'd you get hep to all that fancy figuring, Bill?' We were eating lunch and he was reading some little book he always carried. He looked up at me and said innocently: 'Oh, I just picked it up!' I knew different than that, so I quizzed him until he told me the whole story.

"'Did you ever notice the old men around the shop,' he asked—'the men with families who drudge along day in and day out—never getting anywhere?' I admitted that I had noticed quite a lot of them.

"'Well,' he said 'I made up my mind I wasn't going to spend my whole life in a humdrum job at small wages. So I took a home-study course with the International Correspondence Schools that would give me special training for this business.

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"Well, Charley, that boy went straight on up. The members of the firm heard about his studying in his spare time and encouraged him to keep on. You see where he is today.

"And I—I'm still plugging along at the same old job—struggling to make both ends meet. I had just as good a chance as Billy Stevens, but I let it slip by. Yes, I let it slip by.

"Now, Charley, you've got to want your training bad enough to go get it. That's as far as I can help you; you've got to do the rest yourself.

"I've seen a lot of young men come into this business. Those who went ahead were always those who trained themselves for the job ahead. You can do the same thing.

"Start now! It will take only a moment to sign and mail that coupon. It doesn't obligate you in any way. But it's the most important thing you can do today. Some day I know that you will come to me and thank me for what I'm telling you."

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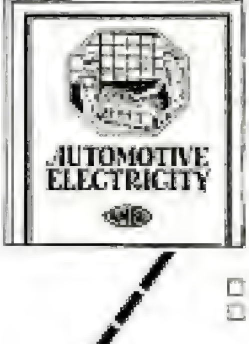

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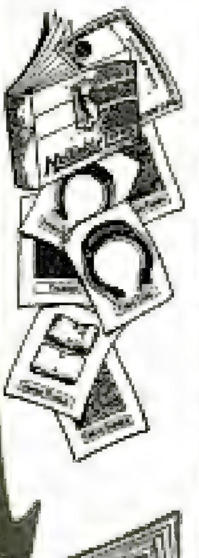

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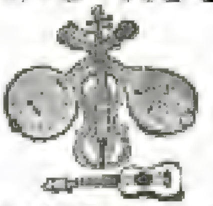

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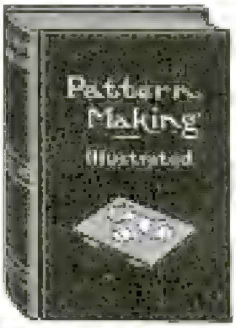

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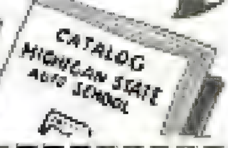

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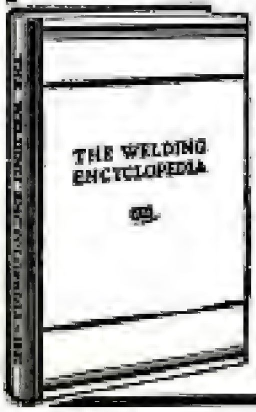

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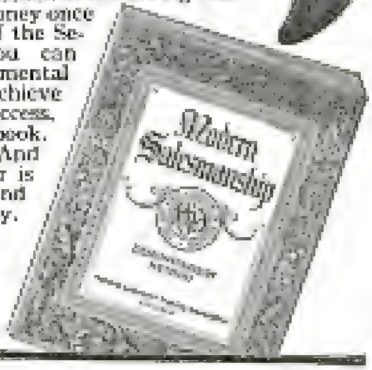

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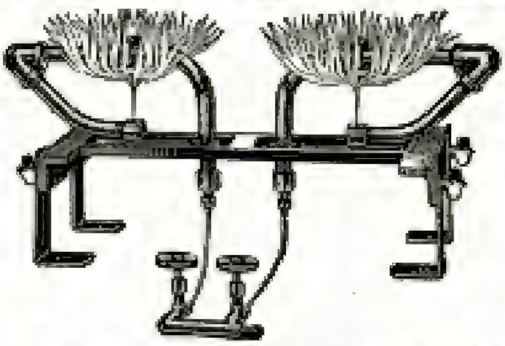

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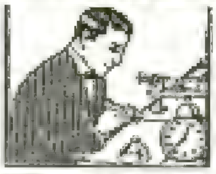

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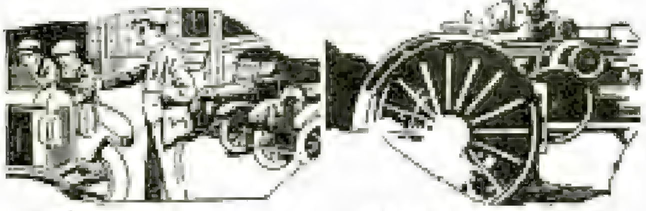

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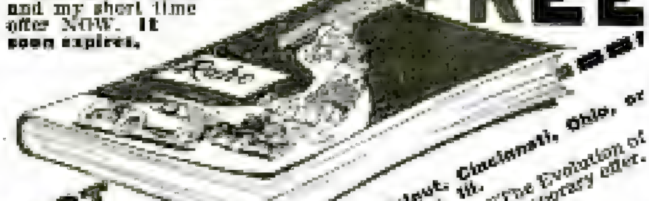

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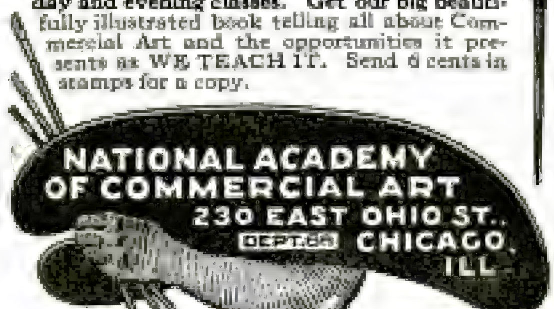

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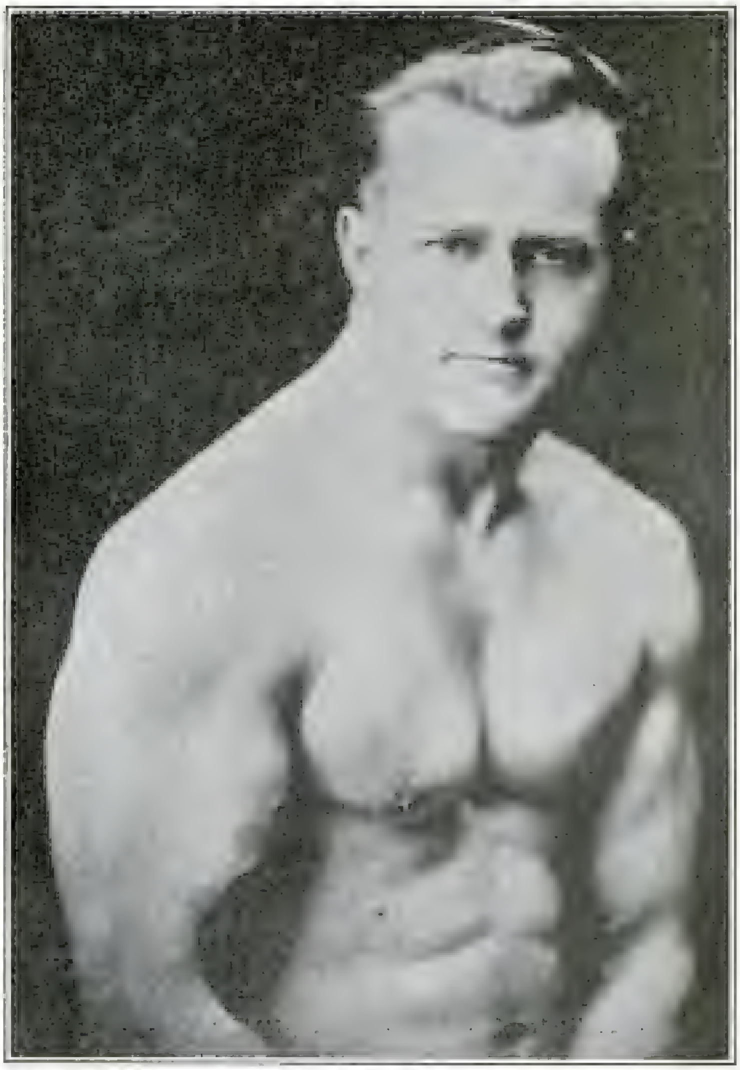

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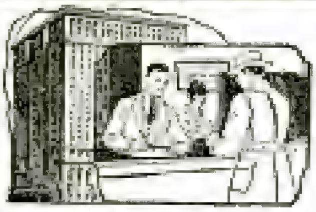

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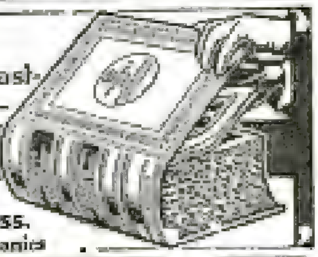

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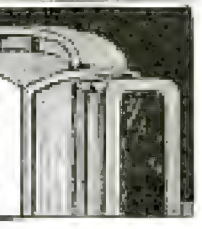

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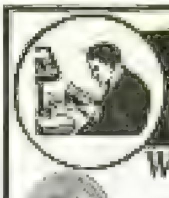

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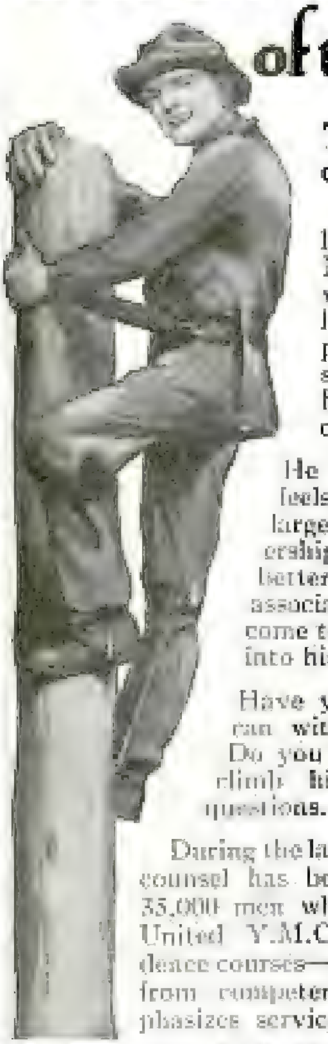

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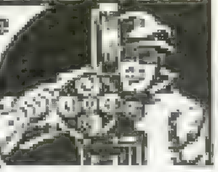

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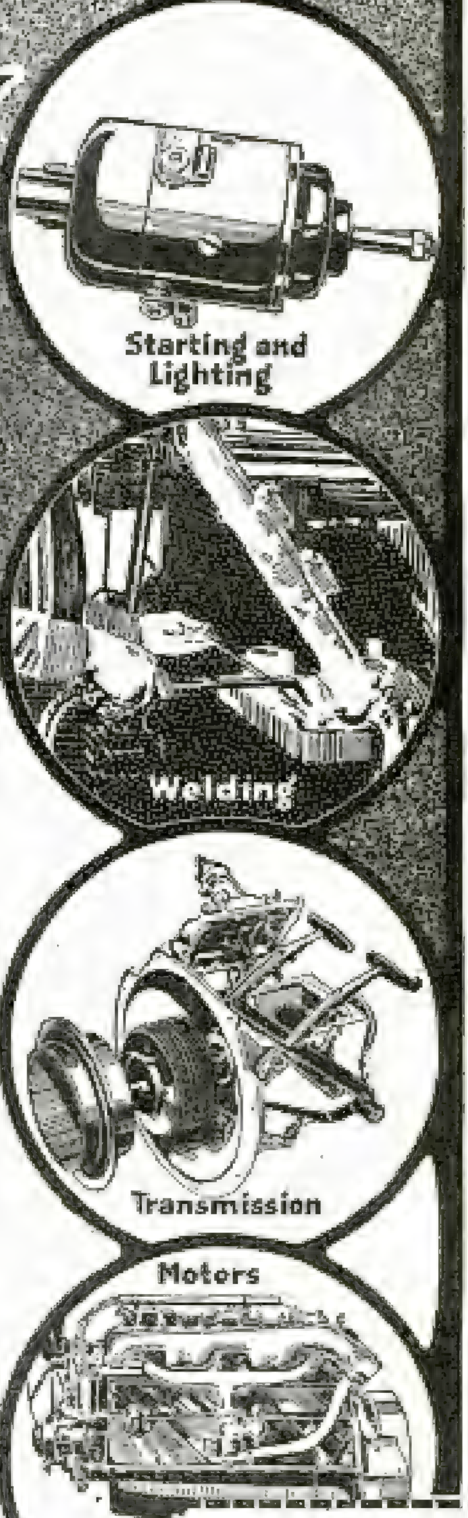

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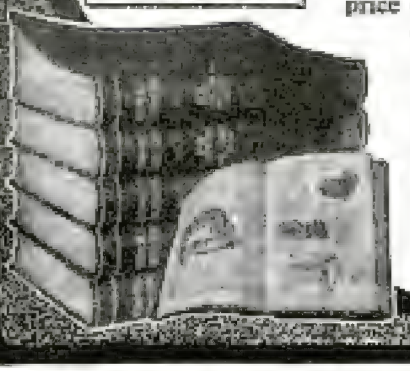

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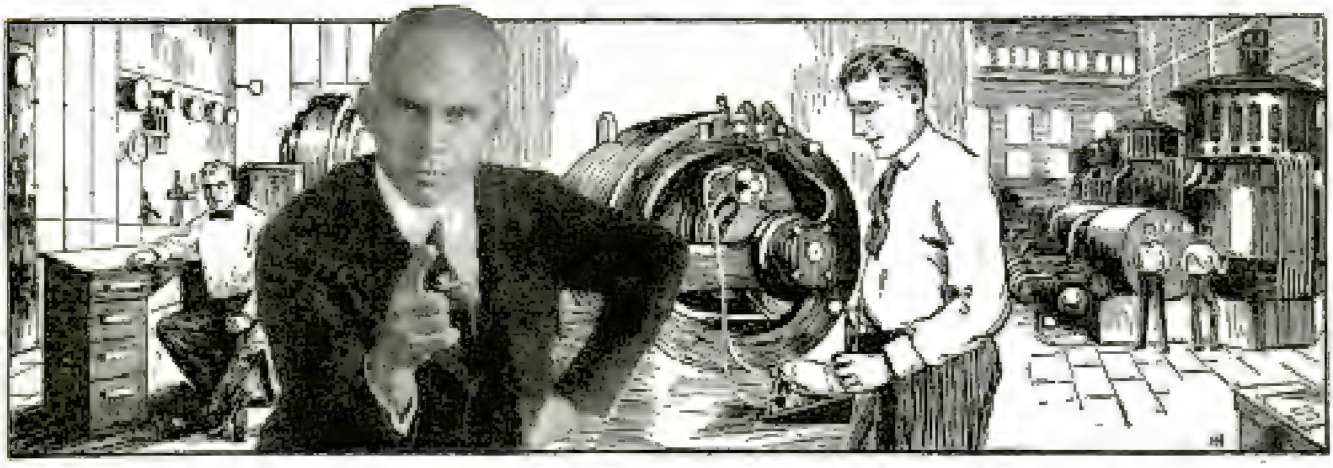

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WANTED—Men or Women to take orders from consumers for Boys' and Girls' Shoes. Whole or spare time. Quality guaranteed. We deliver. A. P. Condon, Sales Manager Allen Shoe Co., 101 Summer St., Boston, Mass.

MEN—"Start a varnish polish business." Automobile, piano owners demand "Fosar." Send 10c postage for free bottle. Demonstrate its merit and get year-around repeat business. Big profits, $5 free advertising in your local paper. Fosar Corp., 600 W. 58th, New York City.

ANY man, anywhere, handy with paint brush or light tools, can start needed painting and mechanical business on nearly nothing. Mostly all profit. Experience not necessary. Testimonials from mechanics from Maine to Oregon. John Breckland, 1457 So. Ninth, Philadelphia, Pa.

SHAVE Without Razor, new discovery, details free. American Pharmacal Co., Box 21, Station A, Cincinnati, O.

$425.00 A MONTH made by Mr. Hertzel selling our Spices, Extracts, Soaps, etc. Write for terms and territory. Lacassia Co., Dept. 127, St. Louis, Mo.

NEW micrometer that reads in fractions. Accurate to the thousandths. Does work of fifty-dollar set. Sells for one dollar. Agents wanted. Belnap, 311 Cumberland Street, Brooklyn, N. Y.

GO Fishing with Wonder Fish Lure. Makes fish bite like hungry wolves. Box 25c, Five $1.00. Don't go thirsty while fishing: Drink Sweetheart Punches; Delicious orange or cherry flavors. Box makes over 25 glasses. Only 25c. Agents wanted. Union Co., Barnes City, Iowa.

AGENTS—Get our big sample assortment tea, coffee, extracts, spices, big line of foods, laundry and toilet soaps; things people eat and use daily; everything furnished. Send postal quick. Dept. A-82, Harley Company, Dayton, Ohio.

AGENTS, Salesmen, Demonstrators, you will have the devil's own time trying to find a better seller than "Zeppo." If there was such a thing we'd have it. Splendid profit on fine "Go Getter" repeat article that sells on ten second demonstration. Works While You Watch It. Demonstrates value, while others waste time making claims. New Discovery! Greatest Scientific Triumph of the age. It's the berries. Haven't room to tell our story here. Write immediately. [illegible]-Smith Co., 600 Clark St., Fort Wayne, Ind.

AGENTS—$15 a day—Easy, quick sales —Free Auto—Big weekly Bonus—$1.50 premium Free to every customer. Simply show our Beautiful 7-piece, Solid Aluminum Handle Cutlery Set. Appeals instantly. We deliver and collect. Pay daily. New Era Mfg. Co., 803 Madison St., Dept. 21-N, Chicago.

$61.50 WEEKLY. Introducing and selling a new gas-light burner for kerosene lamps. Beautiful light. No chimney. No mantle. Samples free. Experience not necessary. Write today. Luther Mfg. Company, Dept. 182, Cincinnati, Ohio.

NO Dull Times Selling Food — The greatest, surest and safest business in the world today is selling Federal Pure Food Products and here is your opportunity to get into this business. You can make $3,000, $5,000, $10,000 or more per year. The only limit is your ability to take care of the business. We print your name and address as distributor on every package, thus making sure that you will get the thousands of dollars' worth of repeat orders which will be sent to you. No dull times, for the people must eat and our food products are the fastest selling, surest and quickest repeat order-getters in the world. Sell on sight in every home where food is used—repeat orders immediately and every week thereafter. A real Big Business All Your Own. Every new customer adds a great deal to your weekly income. Your business once established has a market value just like a store and can be easily sold. The greatest money making opportunity of your lifetime because you risk absolutely nothing as we guarantee your sales, and we will not let you fail. Remember Guaranteed! Best products, biggest sellers, surest repeat orders. No capital or experience is required. We furnish capital and everything necessary for you to become a Federal Distributor. Exclusive territory will be given honest men or women who will write at once asking us to send our "Success Guaranteed" proposition. Address, Federal Pure Food Company, Dept. A, Chicago, Ill. Largest inventors of and packers of Pure Food specialties in the world. Reference, any bank, Dun or Bradstreet rating agency, Express or Railway Company in America.

THIS Is It—Fifty Fast Sellers Everybody needs and buys. Fifty Dollars weekly easily made. B. & G. Rubber Company, Dept. 270, Pittsburgh, Pa.

AGENTS—Make money selling popular Ford Accessories; big demand; quick sales; liberal profits. Every Ford needs them. Write today. Stodeker Mfg. Co., 125 S. Jefferson St., Chicago, Ill.

SAVIOGUN Washing Aid—splendid labor saver. Other specialties also. A paying repeating line for reliable agents. Knox Chemical Co., Dept. A, Rockland, Maine.

MYSTIC Writing Pad. Send 25c for sample. Agents wanted. R. C. Simons, 4829 N. Fairfield, Chicago, Ill.

27,000 RECORDS guaranteed with one Everplay Phonograph Needle; new—different; cannot injure records; $10.00 daily easy. Free sample to workers. Everyday, McClurg Bldg., Desk 65, Chicago.

AGENTS—Something new—everyone buys Gray-Radiant and Luminous Glass Name Plates, House Numbers, etc. You sell for $1.75 and make $1.45. Ten sales per day easy. Start big-paying business of your own. No experience necessary. Mail card for complete money-making plans. Address Crystal Products Co., 30 Wayne St., Big Prairie, Ohio.

PORTRAITS, photo pillow tops, frames, sheet pictures, medallions, merchant's signs, water-proof and tea aprons, guaranteed hose, toilet requisites, luminous crucifixes; catalog. 50 specialties free. 30 days' credit. Jas. C. Bailey Co., Desk M-6, Chicago.

TAILORING Salesmen: Make $75 a week selling our strictly All-Wool Made-to-Measure Suits. You collect profits in advance and keep them. We supply finest selling outfit in America. Many exclusive money-making features. Tailoring, raincoat and side-line men, part or full time, get in touch with us immediately. Park Tailoring Co., Dept. 627, Chicago.

AGENTS: 100% profit. $50.00 to $100.00 a week. Wonderful new tire protector—prevents punctures and blow-outs. Installed without tools. Sells on sight. Wilson made $100.00 first week. Territory going fast. Write at once for interesting money-back proposition. Pelletier Tire Company, 342 W. Jackson, Chicago.

WANTED—Men to put up window displays. Pleasant work, easy pay, and an opportunity to learn salesmanship. Fine chance for advancement. Send full information and references to the Skot Company, Hartford, Conn.

WHY not sell us your spare time? $1.00 per hour, $9.85 Daily easy for full time—introducing New Style Guaranteed Hosiery—57 styles, 17 colors. No capital or experience required. Just write orders. We deliver and collect. Your pay daily, also monthly bonus. Free auto offer besides. Complete outfit furnished. All colors-grades, including silks. Mac-O-Chee Mills Co., Desk 2306, Cincinnati, Ohio.

TAILORING agents wanted—to sell all wool suits tailored to order $29.50, all wool tropical worsteds two-piece suits—$13.50. Palm Beaches—$17.50. We believe this is the best and biggest value line in America for the man who believes in pleasing his customers and getting repeat business. To such men we will gladly send full information about our selling plan. Address Sales-manager, J. B. Simpson, Dept. 552, 831 W. Adams St., Chicago.

WORLD'S fastest agent's seller. 300% Profit. Needed in every home and store. Establish permanent business. Premier Mfg. Co., 813 E. Grand Blvd., Detroit, Mich.

AGENTS—Make big money taking orders for Inside Tires. Positively prevent punctures and blowouts. Double tire mileage, any tire, old or new. Old worn-out casings give 3 to 5 thousand miles more service. Use over and over again. Low priced. Big demand. One customer brings four others. Big money saver. Write for terms. American Accessories Co., B-675, Cincinnati, Ohio.

AGENTS—Make $7 to $11 a day. Brand new Aluminum handle Cutlery Set. You take orders, we deliver and collect. Pay you daily. Full or spare time. No experience necessary. No capital. We need 1500 Sales agents, men or women, to cover every county in the U. S. Demand enormous. Write quick. Jennings Mfg. Co., Dept. 1566, Dayton, Ohio.

MAKE money silvering mirrors, all kinds plating, knives, spoons, auto headlights. Outfits furnished. Free booklet. International Laboratories, Dept. 25, 311 Fifth Avenue, New York.

AGENTS: Sell biggest sensation. New; different; large profits. 12,000,000 prospects. $12 daily easy. Free sample to workers. Higgins, Manager, Desk 622, McClurg Bldg., Chicago.

AGENTS—Something New—fastest sellers and quickest repeaters on earth. Permanent, easy, profitable business. Good for $42 to $58 a week. Address, American Products Co., 8131 American Bldg., Cincinnati, Ohio.

AGENTS Wanted—Something New—Fire Fighter sells easily. Makes a spectacular demonstration; car owners, homes, factories, stores, practically buy on sight. Our men make $10.00 to $50.00 a day; exclusive territory. If you wish to establish a business of your own with unlimited possibilities for making big money, write us today. Fyr-Fyter Co., 103 Fyr-Fyter Bldg., Dayton, Ohio.

AGENTS: Make $16 a day. Take orders for Screenls. Does more than machines costing five times its price. Built in just like a staircase. Fully guaranteed. Pay you daily. Big season just starting. Write for terms. Perry-Ludlow Co., Class 102, Dayton, Ohio.

AGENTS—$6 to $12 a day. Sell Pinehurst guaranteed hosiery for men, women, children. Full line. All styles, colors. No experience needed. Full or spare time. Repeat orders run 90%. Prompt deliveries. Samples to start you. Parker Mfg. Co., Supply 478, Dayton, Ohio.

MAKE 500% profit applying gold initials to automobiles. Samples free. Ralco, [illegible] Harrison Ave., Boston, Mass.

SIDE-LINE Salesmen. Big profits assured. National organization selling staple specialties to trade or consumer. Send for catalogue and mighty sales plan. Ostro Corporation, 124-L East 25th Street, New York, N. Y.

WHY work for others? Make and sell your own goods. We show you how. Enormous profits. Write quick for free book explaining everything. National Scientific Laboratories, 211 North Monroe, Richmond, Va.

EARN $10 daily silvering mirrors, plating and refinishing metalware, autos, chandeliers, bedsteads, headlights. Outfits furnished. [illegible] Laboratories, 1133 Broadway, New York City.

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AGENTS: Housewives Everywhere Delighted with new article which removes stains from clothing, table linen, etc. Write quick for territory and sample. Can make $2 an hour. Christy, 79-Union, Newark, N. Y.

TERRITORIAL Distributors for a specialty of genuine merit in big demand. Send references with application for territory and details. Sales manager, 2961 Grand River Ave., Detroit, Mich.

AGENTS can easily make 100—150 packages Sweetest Sachet for $3.00. Complete instructions 25c. J. B. Fogal Co., Asbury Park, N. J.

START your own business as our sole agent, selling 100 famous home products. All or spare time. Dr. Blair Laboratories, Dept. 524, Lynchburg, Va.

AGENTS—If you have formerly sold felt rugs, write for our new proposition concerning new goods. It's a winner. Newark Felt Rug Company, 56-C Bergen Street, Newark, N. J.

"SECUR-LOCK" for screen doors: catch and lock combined; four screws, no chiseling; guaranteed; quick seller; good profit. Pressed Steel Products Co., Plantsville, Conn.

AGENTS—$1.25 Profit on every sale of Nibco Service Set. Needed in every home and building. Get particulars quick. A. A. Silver-Chamberlin Company, Clayton, N. J.

$60 TO $70 Weekly Easily Made Selling Permanite. Keeps metals bright. What territory do you want on this new invention of wonderful appeal to everybody? Sensational seller, Sales guaranteed! Product guaranteed! Come and grow with us. A postal will do. Consolidated Chemical Works, 253F, Broadway, New York.

WANTED—District Purchasing agents, experience unnecessary. National Instrument Co., 4745 North Hamilton, Chicago.

AGENTS Sell Harper's Household Cleaning Set. Washes and dries windows, mops, scrubs, cleans walls, hangs paper, sweeps, etc. Complete set sells for less than $3. Over 100% profit. Can start without a cent. Harper Brush Works, 118 A St., Fairfield, Ia.

EARN big money easily with our casting Toy and Novelty forms, making Whistling Birds, Wild Animals, Crowing Roosters, Automobiles, Baseball Players, Statue of Liberty, Indians, Toy Soldiers, Cowboys, Barking Dogs, Wag-Tail Pups, Miniature castings of Capitol, Bathing Girl, Souvenirs and others. No experience necessary. We furnish you with Bronze casting Forms and necessary outfit from $3.50 up. We buy large quantities of finished goods at highest prices. Spot cash. Send for catalogue and information free. The Improved Metal Casting Co., 342 East 145th Street, New York.

GRITO Laundry Tablets take the rub out of rubbing. Wash clothes snow-white in 15 minutes absolutely without rubbing. Tremendous Seller. Enormous profits. Big Repeater. Sample Free. Grito Soap & Mfg. Co., Dept. X, Rochester, N. Y.

GET posted—Great prices paid for butterflies, insects. See Sinclair display advertisement, page 28.

MAKE $30.00 daily taking orders for $3.95 Union-made raincoats. Factory prices. Largest commission. Your pay daily. We deliver and collect. American Eagle Raincoat Co., 155 No. Union St., Dept. 316, Chicago.

$100 TO $300 a week. Men with slight knowledge of motors who can reach car owners can earn $200 weekly without making single sale. If they can also make sales, profits may reach $25,000 yearly. Only proposition of its kind ever offered. A. E. Phillips, 228 West 28th St., New York.

AGENTS sell Laundry Tablets under your own name and brand. Free samples and circulars furnished with every order. Particulars free; sample, fifteen cents. Write today. Kreis A Products, College Point, N. Y.

PORTRAIT agents earn big money selling our Photo medallions, Photo medallion clocks, Religious medallions, Photo pocket mirrors, Photo buttons, Photo jewelry, and Fraternal Photo medallions. Send for free catalogue. Satisfaction guaranteed. Four-day service. Address Gibson Photo Jewelry Co., Apartment 7, 608 Gravesend Ave., Brooklyn, N. Y.

$100 MADE in one week by young man in small town without capital or experience in local advertising business. Why can't you do likewise? Free book tells how. S. Meyer, 211 Seventh St., Louisville, Ky.

SELL Kwik-Kut Knives to every woman who sews, and every man who wants a very sharp knife for light cutting. Uses discarded razor blades. Big profits and quick sales. Sample postpaid 25c, refunded on first order of two dozen or more. Kwik-Kut Knife Company, 1013 Chestnut St., St. Louis, Mo.

AGENTS wanted to sell "Havana Trust" 5c cigars to stores and smokers. Profitable business. Havana Trust Cigar Co., Utica, N. Y.

OWN a Business. Make Sparkling Glass Name Plates, Numbers, Checkerboards, Medallions, Signs. Quick Sales, big profits. Illustrated booklet Free. E. Palmer, 558 Wooster, Ohio.

FREE Sample. "Rain Shield Wiper." Retails $1.00—Costs (25c). Sold, Clear and Rainy Days. No Cloth—No Paste—No Attachment. (1) Rub keeps Windshield Clear (48) Hours. Experience unnecessary. NuLife (H) Corporation, Hartford, Conn.

(1) RUB Metal Polish Chamois Cloth. Retails (25c)—Costs (11c). Cleans, Polishes Silverware, Brass, all Metals. NuLife (A) Metal, Hartford, Conn.

AGENTS—Make $5.00 an hour: our beautiful silk knitted neckwear sells on sight; latest New York styles direct from mill to you; popular price; instant sales, steady all year round proposition; big repeater; your own territory open. Write today. Knit-Art Silk Neckwear Co., 208 Broadway, New York.

WHY work for others? Make and sell your own goods. We show you how. Enormous profits. Write quick for free book explaining everything. National Scientific Laboratories, 211 North Monroe, Richmond, Va.

ICELESS Refrigerators: How to make, how to sell them, and how to finance your business. Details from Sensible System, 1683 O'Farrell St., San Francisco, Calif.

ROBERT Wrench is a sensation in wrenches. It surprises everybody. Grasps pipes, nuts and bolts any size without adjusting. Over 20,000 sold. You make almost 100 per cent profit. If you call on stores, shops, garages, factories or homes, write us today for full particulars about "The Wrench With The Bull Dog Grip." Robert Wrench Co., 71 Murray St., New York.

AGENTS—Household necessities galore; food products, toilet preparations, extracts, remedies, soaps, beverages, jewelry; catalogs free. Western Products, 600 N. Oakley, Dept. AE, Chicago.

AGENTS—500% Profit. Sell on Sight New Useful Article for Phonograph. Sample 50 cents. Brown Co., Box 421, Ft. Wayne, Ind.

GOLD Leaf Sign Letters; make and sell; profits exceed 1,000%; immense demand; particulars free. Johnston Co., Quincy, Ill.

MAKE a Steady Income on Jubilee Auto Accessories. Easily sold to all garages or accessory dealers. Side wings, fuses, spark plugs, oil gauge, windshield cleaners, transformers. Sell whole line or any part. We carry customers' accounts. Generous commissions. Low prices. Jubilee Mfg. Co., 21 Sta. C, Omaha, Neb.

$2.00 AN hour Selling Peck's Rivets. Instantly mend Kitchen utensils. Other fast sellers. Sample 10c. Peck Co., Dept. A2, Medina, N. Y.

SLIDEMUP—Expanding Kuff Buttons. Great shirt savers, wonderful convenience. Sample pair $1.00. Fifty other jewelry specialties at wholesale—Liberal credit. Flexo Comp. Sheboygan, Wis.

EXCEPTIONAL household products—Will absolutely sell on sight. Widely recommended. Write, Associated Chemical Laboratories, 63 Fulton Street, New York City.

AGENTS—$50 a week taking orders for guaranteed hosiery for men, women and children. Must wear 12 months or replaced free. All styles and finest line of silk hose. Write for sample outfit. Thomas Mfg. Co., Class 262, Dayton, Ohio.

EVERYBODY uses extracts. Sell Duo Double Strength Extracts. Complete line household necessities. Big repeaters. Write today. Duo Co., Dept. E1, Attica, N. Y.

SELL Keyless Padlocks for quick money. Particulars free. "Nigmon," 275 Highland, Milwaukee, Wis.

WILLIAMS' No Water Hand Soap, in tubes, has taken Auto owners by storm; washes dirtiest hands perfectly clean without water. Easy demonstration, quick sales, 150% profit. W. B. P. Williams, Montclair, N. J.

EARN $10-$30 weekly, distributing circulars. Palace Mfg. Co., Toledo, Ohio.

RUSSIAN, German, Austrian money. Sensational street seller! Wonderful sales-boosting premiums for anybody who sells anything! Hirschcrown, 847 Huntspoint Ave., New York. (Cheapest prices.)

SELL "Wire Arm Bands," 25c retail. 200% profit. Bonner Arndt, 3689 Townsend, Detroit, Mich.

BIG Profits Selling New $3.50 Automatic Adding Machine. Absolutely accurate. Fully guaranteed. Quick sales. Ten daily easy. No competition. Pocket size. Business people everywhere positive customers. Thousands being sold. Tremendous demand. Here's high-grade money-maker. Bassett Co., 1458-S Hollywood Ave., Chicago.

AGENTS wanted in all towns and cities where milk is sold in bottles to sell new patent Cream Separator. Every woman buys. 100% profit. Send 35c for sample and confidential price list. Perfect Cream & Cap Remover Co., 450 N. Cicero Ave., Chicago, Ill.

AGENTS: Leather bill fold. Particulars free; sample 50c postpaid. Hyde Park Bargain House, 5147 Ingleside, Chicago.

$35.00 PROFIT on $1.50 Outfit; Gold Initials for Automobiles, Bags, etc.; Free Samples. National Monogram Co., Station D, Brooklyn, N. Y.

$8.00 TO $20.00 per day. A wonderful seller. Any man, woman, boy or girl can make big wages Selling Crimp Grip Clothes Line Fasteners. It is a perfect rope holder and can be used for many purposes. Crimp Grips are a simple, time-saving device. They last a life time and will not rust; it holds the line tight, and saves time on wash days. Every buyer is a booster. Send 50c for Mounted Sample and one pair of Crimp Grip Clothes Line Fasteners. Write for particulars. Crimp Grip Company, Belvidere, Ill.

SELL wall and auto emblems, and town plates. Every lodge member and auto owner buys. Big money—all or spare time. Free sample and cash bonus plan. Kier Emblem Co., 410 Como Bldg., Chicago.

AGENTS—$100.00 weekly, selling tailored caps. Can use limited number of agents. Commissions paid daily. Wonderful sample outfit to those selected. We deliver and collect. Send application today. Kramer-Phillips Co., 453 Monon Bldg., Chicago.

PICTURE Man Friedman is giving away free $2.00 samples and valuable book on canvassing. Prints, Portraits, Frames, Picture Man Friedman, Dept. 8-H, 673 Madison, Chicago.

AGENTS—Sell 3 in one shade, curtain and drape holder. $20.00 daily. Sample Free. Standard Specialty Products, 25 No. Dearborn St., Suite 502, Chicago.

PATENTS Procured. Send sketch or model today for examination, prompt report and advice. No charge for preliminary advice. Write for free Booklet and blank form on which to disclose your idea. Highest references. Promptness assured. Clarence A. O'Brien, Registered Patent Lawyer, 562 Southern Building, Washington, D. C.

PROTECT your rights—Write for "Record of Invention" and booklet about Patents. Prompt personal service. Advice without charge. J. Reaney Kelly, 612-G Columbian Building, Washington, D. C.

PREPARE—Sell Your Own Products. Formulas, trade secrets. Different, dependable. Catalog free. S. Tinsley Co., Washington, D. C.

AGENTS—Sell silk knitted ties. $5.00 a dozen. Sample 50c postpaid. Imperial Mail-Order House, 580 Cottage St., New Bedford, Mass.

RED STAR Straw Hat Cleaner. Finest on market. Instantly cleans hats like new. Non-poisonous. Package and wonderful premium book 10c. Byron, Box 87, Sta. 1, New York.

MAKE $10 to $20 a Day selling "Peanut Fluff," the best 10c candy Bar on the Market. Send 25c for three large bars and instructions how to sell them. M. N. Nelis, Rockford, Ill.

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MAKE good profits. Sell the Twentieth Century Polar Ice Blanket. Saves ice. Send $1.50 for sample. Polar Ice Blanket Co., 115½ Harrison St., Davenport, Iowa.

WORLD'S Greatest 10c Sellers. Needle-threaders, $2.50 gross. Sample 10c. Also lucky charms. Pencil sharpeners. Hutter Specialties, Milton, N. Y.

LIFETIME Guaranteed metal outfit makes article costing 1c, sells 10-15c like wildfire. Price, $7.50. Sample, 25c. New Jersey Specialty Co., 16 Bergen Sta., Jersey City, N. J.

EVERYBODY buys ice-saving cloths. Peerless Products Co., Jackson, Tenn.

DISTRIBUTORS wanted in each state for Dixie Lighting and Power Plants, Auto and Radio Batteries. Dixie Storage Battery Company, Baltimore, Maryland.

BIG money in New Bamboo self-filling Fountain Pen. Sells everywhere. Sample 75c. Write for particulars. T. Kobayashi & Co., Dept. 40, 311 River Street, Chicago, Ill.

WANT Distributing Agents everywhere for Hanslick, the new original powdered handsoap. Removes grease, grime, ink, paint, and most anything from the hands without injury to the skin. Every mechanic and auto-owner, everybody who gets his hands dirty will be a customer. A great opportunity for a hustler to get in business for himself. Full information free. Send 10 cents, coin or stamps, for liberal sample can. Solar Products Company, 122 West Lake Street, Chicago.

AGENTS—Send for sample "Fretnot"—the washday wonder. Be convinced you can do a whirlwind business. You can clear at least $20 to $100 weekly, according spare or whole time. You don't have to talk; if she doesn't buy at sight, leave sample; she will be looking for you long before you are able to make the rounds again. Samples furnished free. Premiums for your customers. Exclusive territory guaranteed to agents who can produce. Credits given. Don't call. F. M. Molter & Sons, 20 E. Jackson Blvd., Chicago.

LARGE Shirt Manufacturer wants Agents to sell complete line of shirts direct to wearer. Exclusive patterns. Big values. Free samples. Address Madison Mills, 503 Broadway, New York.

AGENTS—Best seller: Jem Rubber Repair for tires and tubes; supersedes vulcanization at saving of over 800 per cent; put it on cold, vulcanizes itself in two minutes, and is guaranteed to last the life of the tire or tube. Sells to every auto owner and accessory dealer. For particulars how to make big money and free sample, address Amazon Rubber Co., Amazon Bldg., Philadelphia, Pa., Dept. 505.

AUTO owner tire agent wanted each locality to use and take orders for handmade Mellinger fabric and cord tires; guarantee bond 8,000 and 12,000 miles (no seconds); shipped prepaid on approval; get your tires free; no capital or experience required; make $100 to $300 weekly. Write for wholesale prices and sample kit. Address, Mellinger Tire Co., Dept. 109, Kansas City, Mo.

AGENTS make $10.00 a day or more selling Coffield Tire Protectors. Prevents punctures and blow-outs. Doubles mileage. Easily applied, no cement or tools required. Absolute three-year guarantee. Nothing like them. No capital required. Big commissions paid weekly. No delivering. Get our proposition. Write Coffield Tire Protector Co., 275 Court St., Dayton, Ohio.

AT Last—World's Greatest Adding Machine. Almost human. Retails $15; work equals $300 machine. $500 monthly easily made, demonstrating to stores, offices, garages, factories. Simple, easy; adds, subtracts, multiplies, divides automatically. Speedy, accurate, durable, handsome. Five year guarantee. Tremendous demand; amazing profits. Liberal trial offer. Protected territory. Write quick. Lightning Calculator Corp., Dept. F, Grand Rapids, Mich.

GREATEST Sensation! Eleven piece toilet article set selling like blazes at $1.75, with $1.00 dressmakers' shears free to each customer. Spring rush on. Foster Reid Co., 38 Winslow Bldg., Station C, Chicago.

ONLY One Policy Daily Means $130 per Month Profit. Same on renewals. Policy pays $5,000 death; $25 weekly benefit for injury or sickness. Men and women both acceptable. Premium $10 yearly. Full or spare time. Easy seller. Write quick for territory. Underwriters, Dept. R.L., 198 Market St., Newark, N. J.

$75.00 WEEKLY with new specialty. Sells on sight to auto owners and trade. One man in Columbus, Ohio, sold 35 gross in 60 days. 100 to 200% profit on small investment. Write today for wonder-selling plan and information. C. L. Winegar, Dept. 13, West Fort Ann, N. Y.

500% PROFIT selling Genuine Gold Leaf sign letters. Guaranteed never to fade. Easily applied. Experience unnecessary. Wonderful future. Free Samples. Guarantee Sign Service, 363 W. Superior, Chicago.

WANTED—Tailoring Sales Agent—Make big money from very start—$60.00 to $75.00 weekly. Largest made-to-measure tailoring house, furnishing an equipment of five hundred woolens, wants you to take orders. Satisfaction guaranteed. Biggest merchants in many towns have started with our line. If you want to establish yourself permanently in business and make big money write for full particulars, giving your experience as salesman or tailor's sales agent. H. F. Foster, Sales Manager, Lock Box 483, Chicago.

DUSTLESS Sponge Cloth. New Invention. Retails (50c)—Costs (16c). (1) Rub Cleans, Polishes Automobiles, Pianos, Furniture. NuLife (A) Sponge, Hartford, Conn.

WHY work for others? Make and sell your own goods. We show you how. Enormous profits. Write quick for free book explaining everything. National Scientific Laboratories, 211 North Monroe, Richmond, Va.

AGENTS — At last! Special machinery enables us to sell our patented curtain rods at the old price of Three Cents each. Big Spring sellers. Write Home Curtain Rod Co., Providence, R. I.

EARN big money fast applying gold initials to autos. Every owner buys—$1.35 profit on $1.50 sale—particulars and samples free. Write quick, Lithogram Co., Dept. 17, East Orange, N. J.

$75-$150 WEEKLY assured if you hustle. Sell attractive gold signs to stores, offices. Unlimited demand. Experience unnecessary. Free samples. Acme Letter Co., 303 W. Superior, Chicago.

$10 DAILY and more to real workers. New discovery sells like hot cakes to homes, merchants, everybody. Over 100% profit. Popular price. Big repeater. Exclusive territory. Write for Money-Coining sales plan. Denmac Co., Dept. E, 347 Madison Ave., New York.

REX India Fibre Broom; One of the biggest sellers on market. Outlasts five ordinary brooms—price no higher. 100% profit. Rex Fibre Products Company, 145-C New Jersey Ave., Brooklyn, New York.

BIG Money and Fast Sales. Every owner buys Gold Initials for his auto. You charge $1.50; make $1.35. Ten orders a day easy. Write for particulars and free samples. American Monogram Co., Dept. 40, East Orange, N. J.

OUR Ex-Cel Luminous Crucifix "shines brilliantly in the dark." Sells on first demonstration. Big profits. W. G. Hannan Co., Dept. B, 57 E. 18th St., Chicago.

LIVE Agents make $10 Day selling Eureka Strainer and Splash Preventer for every water faucet. Takes on sight. Widely advertised and known. Get details today. A. B. Seed Filter Company, 73 Franklin, New York.

SPECIALTY Salesmen making $10.00 daily selling Ball Valve Non-Splash Water Filters on sight. Best canvassers' article ever put on market. Write for details. C. A. Shinn, Manufacturer, 73 Franklin, New York.

BIG Profits With Exclusive Territory—$50 to $100 weekly easy. More has been made repeatedly in one day's work. Wonderful invention delights householders. Automatic hot and cold water bath outfit without plumbing; only $7.50. Eager buyers everywhere. Send no money. Terms. Write today. Allen Manufacturing Co., 693 Allen Bldg., Toledo, Ohio.

PATENTS—Write for our free illustrated guide book and Evidence of Conception Blank. Send sketch or model for our opinion of its patentable nature free. Highest references. Prompt attention. Reasonable terms. Victor J. Evans & Co., 163 Ninth, Washington, D. C.

"$10 A DAY and More," our new book, shows clearly how you may gain sure success and large profits selling Guaranteed Hosiery and Underwear, factory to family. It is Free. Write today. C. & D. Company, 41-E, Grand Rapids, Mich.

LIVE man to distribute for great "Foot Ointment," hand or mail. Odor sells it. Splendid opportunity. Write now. The Elder Co., 291 Parkdale, Buffalo, N. Y.

AGENTS—$3 per hour and more!! Sell Iron Board Covers, Rubber Aprons, Shopping Bags, Embroidered Aprons, Sateen Coverall Dresses. Free Sample offer! American Braiding Company, Dept. P, 323 W. Monroe, Chicago.

AGENTS—C. T. A. prices reduced again. Suits $18.00 made to order, any size or style. Orders easy to get. Big profits. Sample outfit free. Write Chicago Tailors Ass'n, World's largest tailors, Dept. 207, Station C, Chicago.

MAKE $25 to $50 Week representing Clows' Famous Philadelphia Hosiery, direct from mill—for men, women, children. Every pair guaranteed. Prices that win. Free book "How to Start" tells the story. George Clows Company, Desk 31, Philadelphia, Pa.

AGENTS—Steady Income. Large manufacturer of Handkerchiefs and Dress Goods, etc., wishes representative in each locality. Factory to consumer. Big profits, honest goods. Whole or spare time. Credit given. Send for particulars. Address Freeport Mfg. Co., 59 Main St., Brooklyn, N. Y.

AGENTS—Genuine Gold Letters anyone can put on Store Windows. Guaranteed to not tarnish. Large profits. Enormous demand. Free samples. Write today. Genuine Gold Letter Co., 429-A North Clark, Chicago.

YOU can be your own boss with our Key-Check outfit. Good for $5 a day stamping names on pocket key checks, fobs, etc. Sample check with your name and address, 20 cents. Pease Die Works, Dept. M, Winchester, N. H.

AGENTS: Big Money Monogramming by Transfer Method. Catalog Showing Over 50 Styles and Particulars Free. Motorists' Accessories Co., Mansfield, Ohio.

AGENTS! A sale in every home for our beautiful dress goods, silks and general yard goods. Quick sales! Big profits! Large book of nearly 1000 handsome fabric samples furnished to agents. Write today. National Importing & Mfg. Co., Dept. 6N, 573 Broadway, New York, N. Y.

YOU Can Make Good Durable Paint and Varnish 50c per gallon. Write Dept. 2, Emmelmann Bros. Mfg. Co., Indianapolis Ind.

POLMET Polishing Cloth cleans all metals; retails 25c; sample free. Gale & Co., Inc., 15 Edinboro St., Boston.

MAN in each town to plate auto parts, reflectors, bathroom fixtures, refinish beds, mirrors, chandeliers; by new method. No capital or experience required. Simple plan of manufacturing at home starts you in big money-making business. Outfit furnished. Free particulars and proofs. Gun Metal Co., Ave. H., Decatur, Ill.

AGENTS—New discovery makes all Jelly "Jell." Big profits, constant repeater. Sample free. Address, Joy-Jel Company, 535 Grand, St. Joseph, Mo.

AGENTS—Stamping names on Pocket Key Protectors; sample Check with your name and address, 25c. Stamping Outfits, Emblem Checks, Check Fobs, Name Plates. Hart Mfg. Co., Desk 2, 303 Degraw St., Brooklyn, N. Y.

OUR Agents make $12 to $20 every day and are making it with new invention that sells to everybody. Low Price. Pocket sample. Write Edward Suren Company, 25 N. Dearborn St., Chicago.

AGENTS: Big profits. Best and cheapest window letters made. Easily applied. Dime brings five samples. Particulars free. Stalbrite Co., 1115 Second Ave., New York.

LARGE manufacturer wants agents to sell guaranteed made to measure raincoats. Gabardines and Reversible top and raincoat combined. Make $75 to $100 weekly. Profit in advance. We deliver and collect. Outfit free. Standard Raincoat Co., 141 West 21st Street, New York, N. Y.

AGENTS, Secure exclusive agency for your city. High-class, permanent proposition, worth $10,000 yearly. No investment, everything furnished. Address Box 2022, New Haven, Conn.

EASY, pleasant work for Mechanics, Shop Men, Clerks, during spare hours; will add many dollars to their salaries. Also want persons who can give full time. Big wages assured. Novelty Cutlery Co., 67 Bar St., Canton, O.

Copyrighted material

SELL Necessities. Everybody needs and buys the "Business Guide." Bryant cleared $900.00 in July. Send for sample. It's free. Nichols Co., Box 1-B, Naperville, Ill.

AGENTS—N-R-G Laundry Tablets, the old reliable moneymaker for live agents. Millions sold—used in many homes—sales waiting for you. Clothes washed spotlessly clean in 10 minutes without rubbing. Free samples. N-R-G Company, 732-A N. Franklin, Chicago.

AGENTS: Big Returns, fast office sellers; particulars and samples free. One Dip Pen Co., 2 Daily Record, Baltimore, Md.

AGENTS make $10 daily—Big line guaranteed extracts, food products, perfumes, toilet goods, household necessities. No capital or experience needed. Free sample case and instructions. Write for amazing offer. Perkins Products Co., Desk 6, Hastings, Neb.

$100 WEEKLY. Agents, Crew Managers. Absolutely new article selling big to housewives. No capital required. Commissions paid in advance. No collections. No delivery. Exclusive territory. Write quick. Pioneer Corp., 6301 Yale Ave., Chicago, Ill.

$15.00 DAILY selling Radio Gas Lighter. Sells on sight. No matches or friction required. Sample, 10c. Rapid Mfg. Co., 10 E. 14 St., New York, N. Y.—Dept. P.

WHY work for others? Make and sell your own goods. We show you how. Enormous profits. Write quick for free book explaining everything. National Scientific Laboratories, 211 North Monroe, Richmond, Va.

AGENTS—Clever Invention! Inkspoon makes every pen a fountain pen. Fast office seller; big profit, demand increasing everywhere. Exclusive territory offered. Sample free. H. Marvel Company, Tribune Bldg., New York, N. Y.

$60-$150 A WEEK. Free Samples Gold Window Letters Easily Applied. Liberal Offer to general agents. Enormous demand. Metallic Letter Co., 438 N. Clark St., Chicago.

DON'T Risk One Penny for Anyone's Formulas for Information to "Make and Sell your own Goods" till I've sent you my Valuable Literature and Many Formula Lists of Guaranteed Reliable Formulas for Manufacturing Biggest Selling Specialties in all lines. Highest References. Twenty-six years supplying the Best. Miller Chemist, 805 De Leon, Tampa, Florida.

SENSATIONAL new vest pocket cigar lighter. Retails $1.00 Triple plated, fastens to watch chain. Agent's sample and particulars, 60c. C. Thomas, 5230 Harrison, Chicago.

AGENTS make 500% profit handling Auto Monograms, New Pictures, Window Letters, Transfer Flags; Novelty Signs. Catalog Free. Write Hinton Co., Star City, Ind.

SELFOLITE—Agents, Streetmen—Selfolite lights any fire while user sleeps, or any time. Performs surprising stunts. Newly patented. Sample 25c, postpaid; money back. Particulars. Kaytwo Mfg. Co., C195 Station A, Boston, Mass.

MOST Wonderful Seller. 98c profit every dollar. No stock to carry. License unnecessary. Sample free. Mission, 2421-FM, Smith, Detroit.

GET Our Free Sample Case—Toilet articles, perfumes and specialties. Wonderfully profitable. La Derma Co., Dept. A, St. Louis, Mo.

AGENTS—Good salary and commission selling "Ratskit," new rat and mouse exterminator; ready for use; no bait required; non-poisonous; rodents die outside premises; no odor. Empire Specialties Co., 1549 N. Wells, Dept. 301, Chicago, Ill.

"HOW to Sell Patents" free. Patent News-O, Washington, D. C.

AGENTS, control territory, Eljot Flavors, household necessities, perfumes, creams, toilet waters, famous "Eljot's Herb Tablets." Jet Pharmacal Co., Allentown, Pa.

HECK-O-BRIGHT Polishing Cloths Sell Fast at 25c. Sample Free. Herkmoit Bros., 3126 Northwestern Ave., Indianapolis, Ind.

CLARKE made $18 an hour selling vest-pocket windshield cleaner needed by every autoist, motorman, engineer; one rub keeps glass clear 24 hours; 40,000 sold; amazing proposition free. Security Mfg. Co., Dept. 662, Toledo, Ohio.

CALIFORNIA Rosebeads selling like hot cakes. Agents coining money; new stuff. Big profits. Catalog free. Mission, 2421-FM, Smith, Detroit.

AGENTS—Sell Neverfail Iron Rust and Stain Remover. Huge profits. Big line. Sample. Write today. Sanford Deal Co., Inc., Newark, N. Y. Dept. 6.

FORD'S use kerosene and start instantly with new Super Carburetor. Seward's profit one day, $74.00. Write quick. 1926 Super, 1504 Fondulac, Milwaukee, Wisc.

SELL "AMENZ" Shirts. Wonderful opportunity for big profits. Made-to-Measure and Stock Shirts; finest materials. Write for details. Menzie Shirt Co., 3048-A Third Ave., New York, N. Y.

AGENTS—Start now, hourly men. Glos-Pen, a 50c machine fountain pen; everybody buys on demonstration. Write for big profit plan. Glos-Pen Co., 15 (FP) Front St., New York.

CABBAGE Cutter, 5 knives, slices 20 vegetables, finer than aluminum; never dulls. 23,000 users Cincinnati alone; endorsed by Good Housekeeping Institute. Sample 48c. Meyer Cutter Co., Colonial Ave., Cincinnati, Ohio.

$75-$150 WEEKLY assured if you hustle. Sell attractive gold signs to stores, offices. Unlimited demand. Experience unnecessary. Free Samples. Acme Letter Co., 303 W. Superior, Chicago.

WANTED—Representatives to sell Automobile necessity. Kills headlight and sun glare. Write for sample. Dept. P, The Clark Products Co., Springfield, Ohio.

PORTRAIT Agents—If you are looking for a better grade of work, we can satisfy you. Our enlargements have that finished appearance together with perfect likeness, which makes it a pleasure to deliver. And best of all our prices are not high. Expert work a specialty. W. G. Hanson Co., Dept. A-5, 57 E. 18th St., Chicago.

AGENTS: Big profits. Genuine Gold Leaf Window Letters anyone can put up. Scripts and 57 varieties. Chicago Agency Co., 342 Altgeld St., Chicago.

PORTRAIT Agents and Others. Get Big Profits. Sell Perry Photo Medallions. You charge $2.98; make 500% profit. $10 daily easy. Big exclusive line. 4-day service. Perry Photo Novelty Corporation, Section 16, 360 Bowery, New York.

WE start You Without a Dollar. Soaps, Extracts, Perfumes, Toilet Goods. Experience unnecessary. Carnation Co., Dept. 281, St. Louis.

AGENTS make a dollar an hour. Sell Mendets, a patent patch for instantly mending leaks in all utensils. Sample package free. Collette Mfg. Co., Dept. 501-B, Amsterdam, N. Y.

AGENTS—Clean up $100 Weekly With "Nifty Nine." Weekly average, 100 sales—dollar profit each. 30-40 sales daily frequently made; demonstrating outfit cinches order. 30 other coin-coaxers, all daily necessities. Postal brings our unique plans. Davis Products Co., Dept. 506, Chicago.

FIFTY "Ideal" Sidelines for Mail Dealers and Agents. 500% profit. K. Home, 1957 Warren, Chicago.

AGENTS—Sell Patented Cigar Lighters and Cigar-Case Moisteners. Big Profits. Start making money at once. Write for circulars, cuts and sales plan. Drake Mfg. Co., Dept. 30, Milwaukee, Wis.

FOUR $7.50 sales to merchants net you $20.00 daily; largest manufacturer of its kind in the World. Sayers Systems, 2815 Sheffield, Chicago.

HIGH-GRADE SALESMEN WANTED

MEN who travel medium size and small towns regularly can add $50 to $150 weekly to their income with the famous K. & S. line of salesboard assortments. Look up our rating in Dun's or ask your banker. Salesboard experience preferred, but not required. Write for complete information. K. & S. Sales Co., Dept. 140, 4325 E. Ravenswood Ave., Chicago.

WANTED: Aggressive salesmen in all sections of the United States and Canada to sell our White Way Shoe Cleaning Gloves, Wire Suede Brushes and Stocking Savers. Every woman and girl is a potential user. Liberal Commission. Give age, experience and territory wanted. The E. T. Gilbert Mfg. Co., 328-30 South Ave., Rochester, N. Y.

IF you can sell, you can make from $75 to $150 a week taking orders for our guaranteed all-wool tailored to measure suits at $29.75. Tailoring experience not necessary. We teach you and supply you with finest selling outfit. We do all delivering. You just write orders and get your pay, cash with order. When you write, state experience and give references. Address Dept. 620, Park Tailoring Company, Chicago.

WANTED—Salesmen calling on garages and tire shops; new tire valve deflator and wrench; sells readily; sample 25 cents. Bowen Sellerstrom Mfg., Hastings, Minn.

WHY not sell us your spare time? $1.00 per hour. $9.85 Daily easy for full time—introducing New Style Guaranteed Hosiery—57 styles, 17 colors. No capital or experience required. Just write orders. We deliver and collect. Your pay daily, also monthly bonus. Free auto offer besides. Complete outfit furnished. All colors—grades, including silks. Mac-O-Chee Mills Co., Desk 3040, Cincinnati, Ohio.

TAILORING agents wanted to sell all wool suits tailored to order, $29.50, all wool tropical worsteds two-piece suits—$19.50, palm beaches, $17.50. We believe this is the best and biggest value line in America for the man who believes in pleasing his customers and getting repeat business. To such men we will gladly send full information about our selling plan. Address Sales-Manager, J. B. Simpson, Dept. 522, 831 W. Adams St., Chicago.

SPECIALTY Salesmen of the highest type to sell Butterfly Tints, a non-boiling dye, to retail stores everywhere on liberal commission basis. Butterfly Tinting Company, Minneapolis, Minn.

EARN $10 daily silvering mirrors, plating and refinishing metalware, autos, chandeliers, bedsteads, headlights. Outfits furnished. R. Decie Laboratories, 1133 Broadway, New York City.

$4.00 PROFIT on Every $5.00 Sale. "Free Sample."—New Specialty. (Money Getter.) Every Storekeeper, Doctor, buys quickly. Experience unnecessary. Territories open. Drawer 516, Hartford, Conn.

SPECIALTY Salesman: Sell Hunt's Self-adjusting Gear Pullers to Garages and Machine Shops. Full time and side line Men wanted. Big Pay. Write Geo. L. Hunt Mfg. Co., Bristol, Wis.

RUMMAGE Sales—Make $50.00 Daily. We start you. Representatives wanted everywhere. Permanent business. Wholesalers, Clinton-Clark & Co., Dept. 108-A, 2704 S. Dearborn St., Chicago.

MAKE a Steady Income on Jubilee Auto Accessories. Easily sold to all garages or accessory dealers. Side wings, visors, spark plugs, oil gauge, windshield cleaners, transformers. Sell whole line or any part. We carry customers' accounts. Generous commissions. Low prices. Jubilee Mfg. Co., 22 Sta. C, Omaha, Neb.

COUNTY representatives to introduce newly patented sharpener for all kinds of safety razor blades. Sample free. Farrow, Box 605, Seattle, Wash.

A WONDERFUL Seller! Any man, woman, boy or girl can make big wages. Some agents make from $5.00 to $20.00 per day. Crimp Grip Clothes Line Fasteners are a simple, time-saving device for holding a rope—also used for many other purposes. It pays for itself quickly in time saved on wash days. No knots—it fastens and releases quickly. Every home a prospect. Every housewife who uses Crimp Grips—and there are thousands of them—is a booster. There is but one Crimp Grip. Write for particulars, or send 50c for one pair and a mounted sample, with full particulars to agents. Crimp Grip Company, Belvidere, Ill.

BEST Seller: Jem Rubber Repair for tires and tubes; supersedes vulcanization at saving of over 800%; put it on cold, vulcanizes itself in two minutes, guaranteed to last life of tire or tube; sells to every auto owner and accessory dealer. Get particulars how to make big money and free sample. Amazon Rubber Co., Philadelphia, Pa., Dept. 510.

TRAVELING Salesmen calling on retail stores wanted by large manufacturer to sell wonderful line of business-boosting articles. Year round, fast selling, main or side line. If not earning $150 weekly, address Elsner Works, 222 Charles St., Boonville, N. Y.

SALESMEN—Become Independent. Own your business; experience unnecessary; selling our $5,000 Accidental Death, $50 Accident, $25 Sick Weekly Benefits; $12.50 yearly; other amounts proportionate. Guaranteed steady income from renewals. $250,000 deposited Insurance Department. Registration Dept. A, Newark, N. J.

TAILORING Salesmen, all towns, for by far best fitting, richest-looking, soft as silk, all wool, made to order men's suits (guaranteed) at wholesale price $27.50. We deliver, collect, furnish advertising. $50 to $100 weekly. Tailoring experience unnecessary. Swatch Outfit shipped for free examination. Wholesale Direct Tailors, Dept. 100, Buffalo, N. Y.

WERE You Ever Offered a Grocery Store? Our Proposition is Better. You can handle Sugar, Flour, Canned Goods, Dried Fruit, Coffee and entire line of Groceries, as well as Paints, Roofing, and Automobile Oils, with no rent to pay; no money invested; take large orders from samples. Goods are guaranteed and proven quality. Selling experience not necessary. Steady, profitable work for "workers." Address Hitchcock-Hill Co., Dept. 209, Chicago, Ill. Reference: Any Bank or Express Co.

GREATEST opportunity for cigar, electrical, drug, grocery and specialty salesmen selling jobbers and retailers nationally advertised Humidifier. Necessary accessory for cigar cases. Something entirely new. Rapid seller. Act quick for protected territory. Herbert Hover, Consumers Bldg., Chicago.

EASY to sell Groceries, Paints, Automobile Oils, Roofing, Stock Food to consumers from samples, no capital or experience necessary; steady, profitable work. Commissions advanced. Satisfaction guaranteed. 50 years in business. Write for full particulars, Loverin & Browne Co., Wholesale Grocers, 1775 S. State Street, Chicago. Ill.

SIGN Letter Agents and Painters: 500% Profit Gold and Silver Sign Letters for Stores and Office Windows. Anyone can put on. Big demand. Free samples. Metallic Letter Co., 431D N. Clark St., Chicago.

CALIFORNIA Rosebeads selling like hot cakes. Agents coining money. Absolutely new. Big profits. Catalog free. Mission, 2421-SP. Smith, Detroit.

SALESMEN Can make $5.00 a day selling our Calendars, Pencils, Signs, Advertising Novelties, Yardsticks, Whistles, etc. Liberal terms. Sells entire year. Flexible line. Local and traveling agencies. Model Calendar Co., Dept. 226, South Bend, Ind.

SALESMEN—Sideline pays five to ten dollars a day taking orders for Specially printed gummed advertising and Match Box Stickers. Write for proposition, samples, etc., today. Beardsley's Printery, Rock Island, Ill.

SELL "Rug Down" snap fasteners. Keeps rugs in place, prevents slipping. Dealers quickly interested. Vest pocket sample. Other quick-selling specialties. State experience, references. Empire Nation Co., 72 Madison Avenue, New York, N. Y.

SALESMEN—Managers—M o s t liberal proposition ever offered on sanitary brushes, mops, dusters. Quality line—quick service—co-operation. Best season now. Write quick. Modern Brush Co., 320 Lane Bldg., Davenport, Iowa.

TAILORING Salesmen—Fastest selling line, suits, made to measure—$29.50—one price, all wool. Profits in advance. Biggest old reliable house. W. D. Smith Co., established 1895, Dept. 12, Chicago.

SPECIALTY Salesmen, if you are convinced that it is "Good Business" to have a fire extinguisher in the home or car when a fire starts, you can sell others. Arrange with us for exclusive territory at a very good income. McMullen Fire Extinguisher Co., 6501 Dubois St., Detroit, Mich.

"OUTOSITE" Aluminum Hip-Suspenders. (Not over shoulders.) Shirt down, pants up. No belt, no pressure. Illustrated, page 153 May Popular Mechanics. Enormous seller. Circular, mass of testimonials. Established price $1.00. Sample pair 50c. (Two 90c.) Dozen $4.80; gross $50.00. Woods, Suite B, 1533 Lafayette, St. Louis.

SOMETHING original! Bundle sold nine merchants—town nine stores. Exclusive features sells "Zim's Peerless" (Collect'em System). Sells $7.50. Creditors' Association, E-342, McKnight Bldg., Minneapolis, Minn.

$5 PROFIT selling $7.50 necessity. Write for sample. Merchants Ass'n, Minneapolis, Minn.

SPECIALTY Salesmen or State Distributors for Auto replacement part. Sells to all leading dealers. Big repeats. Act quick. Good proposition. Keystone Sales Co., Pacific Bldg., San Francisco, Calif.

SALESMEN—New auto tube, seals its own punctures, fully guaranteed. Car owners buy on sight, when demonstration is shown. Harrison Mfg. Co., Hammond, Ind.

ROPP'S Calculator and Short-Cut Arithmetic shows the answer as quickly as a watch shows the time to all problems likely to occur in office, store, shop, bank, farm or factory. Price, pocket size, paper 35 cents, cloth 50 cents, leatherette $1. Desk size, cloth $1.50 postpaid. Popular Mechanics Book Dept., 200 E. Ontario St., Chicago.

HELP WANTED

STOP Working for Wages Immediately. Tousley, Box 1272, San Francisco.

ALL men, women, boys, girls, 17 to 60, willing to accept Government Positions, $117-$190, traveling or stationary. Write Mr. Ozment, 101 St. Louis, Mo., immediately.

UNEMPLOYED: Read Employment Magazine. Copy 10c, 716 Wolfe, Elkhart, Ind.

LOCOMOTIVE Firemen for railroads nearest their homes—everywhere; beginners $150-$250 monthly. Address Railway Association, Desk M-1, Brooklyn, N. Y.

START Silvering Mirrors, Headlights, Tableware. Replate stoves, jewelry. Plans Free. Clarence Sprinkle, Dept. 28, Marion, Ind.

SALESMEN, we pay larger commissions than any other Brush House in the country to men selling our line of Sanitary twisted-in wire Brushes. Sanitary Wire Grip Brush Co., 35 Mercer St., New York.

AGENTS, Distributors, capable of organizing sales force, make from $8,000 to $30,000 yearly; the best and fastest selling automobile accessory on the market; sells 4 to 8 at a time. Write for particulars. Continental Co., 912 7th Ave., New York City.

AUTO Experts needed. $45.00 week. Experience unnecessary. Sample correspondence lessons free. Franklin Institute, Dept. S-401, Rochester, N. Y.

FIREMEN, Brakemen, Baggagemen, Sleeping car, train porters (colored), $140-$200. Experience unnecessary. 819 Railway Bureau, E. St. Louis, Ill.

WHY not sell us your spare time? $1.50 per hour. $9.85 Daily easy for full time—introducing New Style Guaranteed Hosiery—57 styles, 17 colors. No capital or experience required. Just write orders. We deliver and collect. Your pay daily, also monthly bonus. Free auto offer besides. Complete outfit furnished. All colors—grades, including silks. Mac-O-Chee Mills Co., Desk 2906, Cincinnati, Ohio.

LOOK! Men—women, 18 up. U. S. Government Jobs. $1140-$1800. List positions obtainable—free. Write Franklin Institute, Dept. S-21, Rochester, N. Y.

WAKE up. Go in business for yourself. We furnish goods. Territory and instructions free. Bell Lighting Co., Inc., 387 Broadway, New York City.

BE a Finger Print Expert. Demand increasing. Write for special free offer. American Finger Print System, 1960 Broadway, New York.

LOOK! Men—women, 18 up. You are wanted, U. S. Government positions. $1140 to $2300 year. Steady work. Short hours. Life positions. Paid vacation. Work pleasant. Common education sufficient. Influence not needed. Experience unnecessary. List positions and specimen examination questions—free. Write today sure. Franklin Institute, Dept. S-3, Rochester, N. Y.

GOVERNMENT positions, $1,400-$2,300 yearly. Many openings. 32-page information booklet free. Chicago Civil Service College, A-41, Kesner Building, Chicago.

SHOES—Become our local salesman selling high-grade shoes direct to wearer. Quick seller and good commission. Experience not required. Tanners Shoe Mfg. Co., 457 C St., Boston, Mass.

MEN 18-35. Railway Mail Clerks. $1600-$2300. Write for particulars. Franklin Institute, Dept. S-21, Rochester, N. Y.

GET Government, Railway Mail, Postoffice, Clerical positions. Paying $1,400-$2,300. Men, Women. Experience unnecessary. Full particulars free. Write G. W. Robbins, Civil Service Expert, 411 Pope Bldg., Washington, D. C.

GET posted—Good prices paid for butterflies, insects. See Sinclair display advertisement, page 28.

MEN 18-35. Become Railway Mail Clerks, $1600-$2300. List Government positions—free. Franklin Institute, Dept. S-21, Rochester, N. Y.

WRITE articles, stories, news, in spare time for newspapers and magazines. Big pay. Copyright book free. Press Syndicate, 555, St. Louis, Mo.

OUR genuine gold window sign letters are an excellent money-making proposition for handy men. Sharp Sign System, Bethune Ave. E., Detroit, Mich.

LARGE corporation wants a Service Man in every town to paste up its signs on store-keepers' windows. Excellent opportunity for reliable party. Steady work. No experience necessary. We also have attractive proposition for agents and salesmen. Guarantee Sign Service, 431 W. Superior, Chicago.

LANDSCAPE Architects earn big money; needed everywhere! Fascinating work. Particulars free. Address Landscape Gardener, 425 Union League Building, Los Angeles, California.

YOU are wanted! Government Jobs, Railway Mail Clerks, City Carriers. $1100-$2300. Steady work. List positions obtainable—free. Write immediately. Franklin Institute, Dept. S-21, Rochester, N. Y.

EARN $110 to $250 monthly, expenses paid, as Railway Traffic Inspector. Position guaranteed after 3 months' spare time study or money refunded. Excellent opportunities. Write for Free Booklet CM-16. Standard Business Training Inst., Buffalo, N. Y.

MAKE money writing Photo-plays; details free to beginners. No correspondence course. Producers' League, 230 Wainwright, St. Louis.

GOVERNMENT Railway Mail clerks start $133 month; expenses paid. Specimen questions free. Columbus Institute, Dept. E-2, Columbus, Ohio.

INVENTORS desiring to secure patents should write for our book "How to Get Your Patent," tells our terms and methods. Send sketch for our opinion of its patentable nature. Randolph & Co., Patent Attorneys, 620 F, Washington, D. C.

SIGN Letter Agents and Painters—500% Profit. Gold and Silver Sign Letters for Stores and Offices. Windows. Anyone can put on. Big demand. Free Samples. Metallic Letter Co., 431-D N. Clark St., Chicago.

WANTED: Railway Mail Clerks—$1,600 to $2,300. Exams everywhere. Write today for full information. Patterson, Civil Service Expert, Box 4025, Rochester, N. Y.

STORIES, poems, plays, etc., are wanted for publication. Good ideas bring big money. Submit manuscripts or write Literary Bureau, 522, Hannibal, Mo.

HOTELS Need Trained Men. Nation-wide demand for high-salaried men; past experience unnecessary. We train you by mail and put you in touch with big opportunities. Big pay, fine living, interesting work, quick advancement; permanent. Write for Free Book, "Your Big Opportunity." Lewis Hotel Training Schools, Room 351, Washington, D. C.

SILVERING Mirrors, French plate. Easily learned; immense profits. Plans free. Address, Wear Mirror Works, Excelsior Springs, Mo.

BE a Finger Print Expert—Opportunities opening everywhere. Write National System, 180 East 79th, New York.

ART AND ADVERTISING

DECORATORS, Card Writers, Printers, Painters, Artists—Guide for mixing 3,000 colors. Example: Maroon—15 parts red, 2 black. Return mail, $1.00. Fine Arts, 1123 W. 27th, Indianapolis, Ind.

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TYPEWRITERS AND SUPPLIES

UNDERWOOD Typewriters at far less than manufacturers' prices rebuilt, all worn parts replaced, guaranteed good as new. Cash. Instalment payments. Write for Catalog A-151, Shipman-Ward Mfg. Co., estab. 1892. Montrose and Ravenswood Ave., Chicago, Ill.

TYPEWRITERS, all standard makes, $10 up. Fully guaranteed. Free trial. Write for complete lists. Northwestern Typewriter Exchange, 520 West Goethe St., Chicago.

ADDING MACHINES

FREE Trial. Marvelous new Adding Machine. Adds, Subtracts, Multiplies, Divides, automatically. Work equals $350.00 machine. Price only $15.00. Speedy, durable, handsome. Five-year guarantee. Used by largest corporations. Write today for catalog and free trial offer. Lightning Calculator Co., Dept. E. Grand Rapids, Mich.

NEW $3.50 Automatic Adding Machine. Adds, Subtracts, Multiplies. Absolutely accurate. Capacity $999,999.99. Fully guaranteed. 75,000 pleased users. Makes adding easy, positive, quick. Eliminates Mistakes. Saves Time. Postpaid, $3.50. Bassett Co., 1458-B Hollywood Ave., Chicago.

DUPLICATORS AND DEVICES

STENCIL Duplicator — Two Dollars. Prints Typewriting—Handwriting. On Approval. Prizma Specialty Co., M-3, Primos, Pa.

"MODERN" Duplicators save Time, Labor, and Money. Gets Business. Reproduces Typewritten or Penned Letters, Drawings, Lessons, Music, Menus, Bids, Notices, Specifications, Maps or anything in one or more colors. Prints Two per minute. Special Sale On. 30 Days' Free Trial. $2.25 up. Booklet Free. J. G. Durkin-Reeves Co., Pittsburgh, Pa.

YOU can make 50 to 140 copies of a letter, notice, etc., at a cost of three cents on a Heyer Quality Duplicator. Write for free trial offer. The Heyer Duplicator Co., 182 N. Wells St., Chicago, Ill.

BUSINESS SERVICE

INCORPORATE. Our lawyers do the work, saving you time, annoyance and money in incorporating under the most liberal laws of Arizona. Laws and forms free. Southwestern Securities & Investment Co., Box D458, Phoenix, Ariz.

INCORPORATE any enterprise under common law; any capital; transact business any state; no corporation taxes; no personal liability; raise capital; keep control. Booklet free. Herbert Company, 5 Rand McNally Building, Chicago.

PRINTING, ENGRAVING AND MULTIGRAPHING

USE Better Grade Printing. 1,000 Bond Letterheads, $6.00. We print anything. Becker Print Shop, Holgate, Ohio.

500 BOND Letterheads—500 Envelopes—$5.00. Stationery Specialties, Sentinel, Huntersville, N. Y.

500 BOND Letterheads $1.85 postpaid. Grant, 1713-12th, Detroit, Mich.

PRINTING Outfits—Presses, type supplies, type outfits. Send stamp for catalogue. Model Press, York, Penna.

1,000 HAMMERMILL Letterheads or Envelopes, $4.00. Full Line Samples Free. Quality Printshop, Marietta, Ohio.

PRINTING Special: Envelopes—Letterheads, 250 each, $2.65 postpaid. Rodney Haggard, Windsor, N. C.

ONE Hundred each Letterheads; Envelopes: $1.50. Jacobus Service, Irvington, N. J.

WE print anything. Stationery, Cartons. 1,000 small 4-page Circulars, $5.00. Samples Hammermill Cobweb. Commercial Press, Batavia, Ohio.

BETTER Printing for Less Money. Printing users, send for free samples of thousand items. Mattox's Print Shop, Tremont, La.

QUALITY Printing: Reasonable Prices! Tell us your wants and let us quote our Money-Saving prices. Best Work. We print anything. Ernest Fantus, 525 South Dearborn Street, Chicago.

SOMETHING New: Tuck-Pack Business and Calling Cards. 100 printed cards and elegant seal grain case 50c. Agents Wanted—sample case 15c. Anderson Co., Cristie, Wis.

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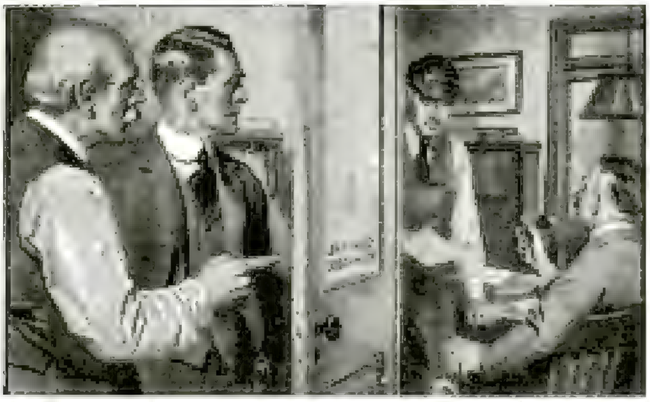

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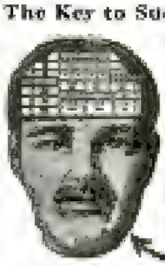

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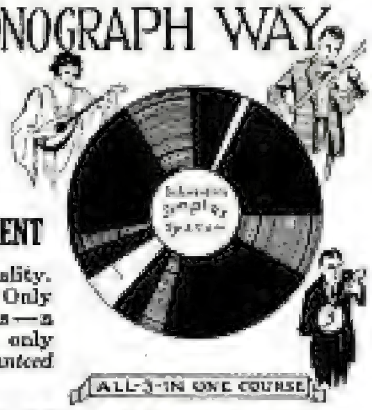

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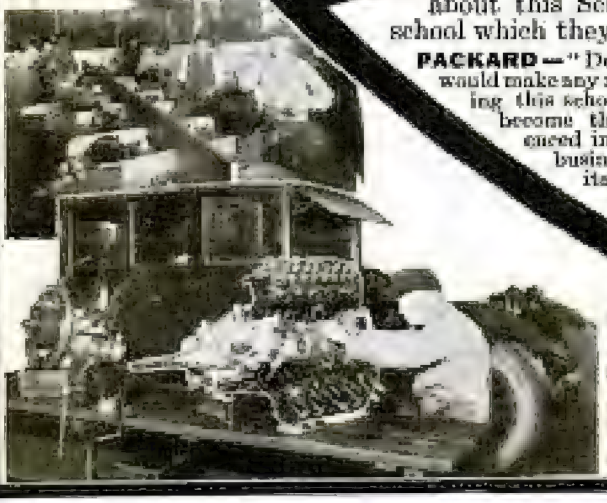

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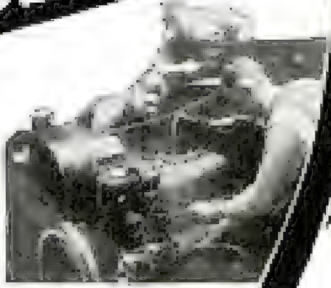
Automobile Industry



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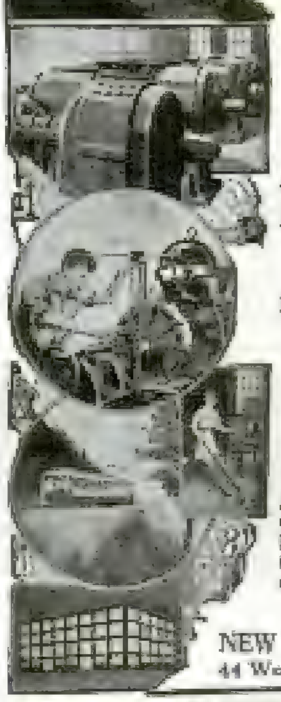

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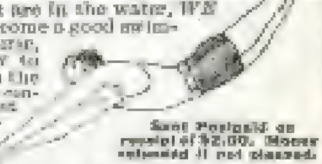

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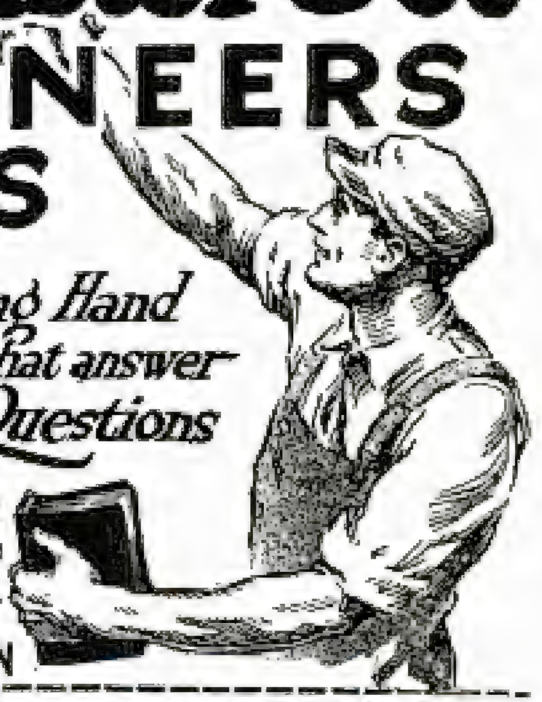

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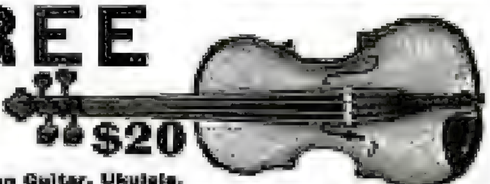

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State of Illinois, County of Cook, ss.
Before me, a notary public in and for the state and county aforesaid, personally appeared H. H. Windsor, who having been duly sworn, according to law, deposes and says that he is the editor and business manager of the Popular Mechanics Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit: First. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Popular Mechanics Co., 200 East Ontario St., Chicago, Ill. Editor, H. H. Windsor, 200 East Ontario St., Chicago, Ill. Managing Editor, J. L. Peabody, 200 East Ontario St., Chicago, Ill. Business Manager, H. H. Windsor, 200 East Ontario St., Chicago, Ill. Second. That the owners are (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): H. H. Windsor, 200 East Ontario St., Chicago, Ill.; L. H. Windsor, 200 East Ontario St., Chicago, Ill.; H. H. Windsor, Jr., 200 East Ontario St., Chicago, Ill.; First Trust and Savings Bank, Trustee for H. H. Windsor, Jr., Chicago, Ill. Third. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none so state) None. Fourth. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him. H. H. WINDSOR, Editor. Sworn to and subscribed before me, this 28th day of March, 1922. J. [illegible], Notary Public. (My commission expires June 13, 1924.)

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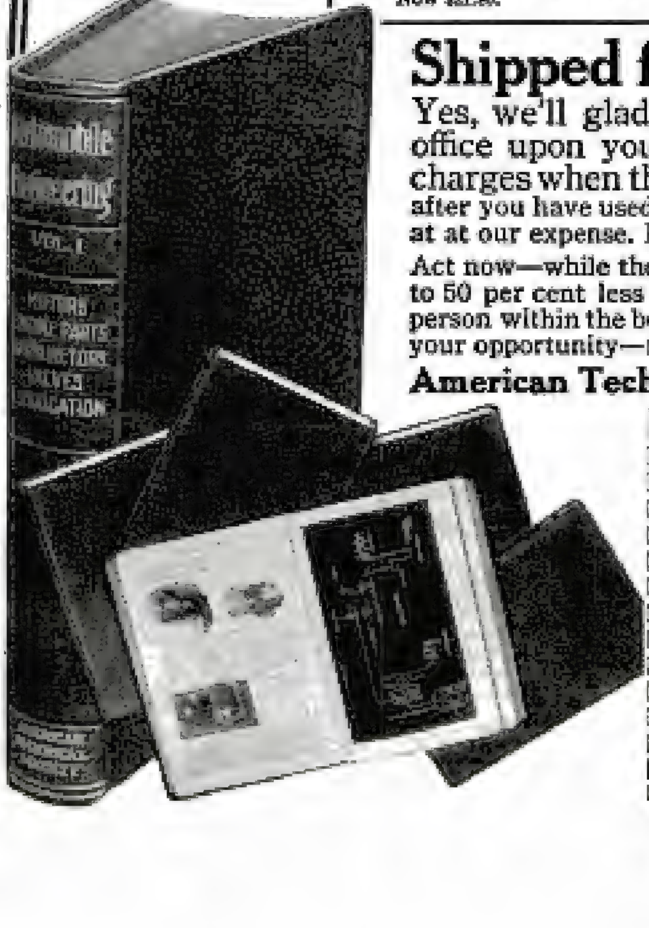

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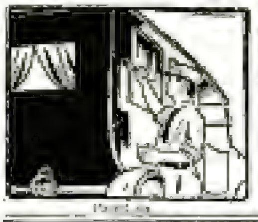

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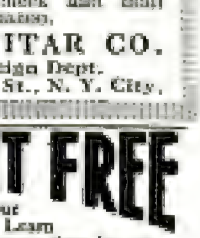

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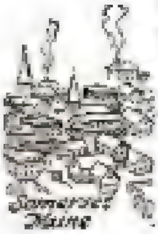

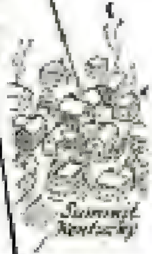

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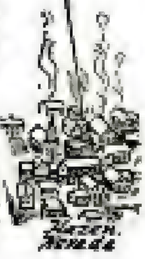

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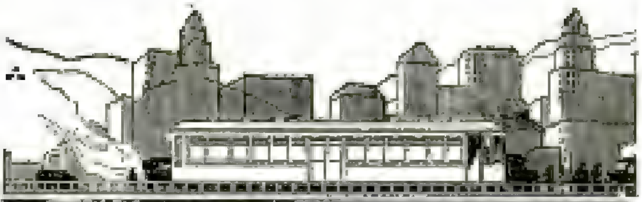

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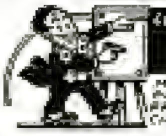

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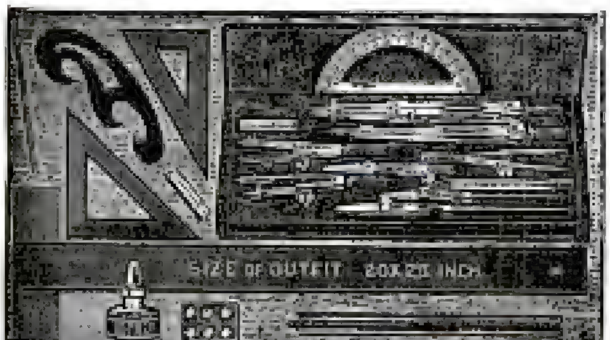

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Vol. 39 JUNE, 1923 No. 6

Spirit Pictures and a Speaking Skull

Remarkable Demonstration in Broad Daylight before the Editors of This Magazine

BY J. L. PEABODY

EVERY one who believes in spiritistic phenomena, as well as those who are openly skeptical, cannot fail to be interested in the "spirit pictures" made by the Jesuit priest, Father de Heredia. The Jesuits, as is commonly known, study diligently for at least 13 years, take the three vows of poverty, chastity, and obedience, and then follow some particular line of study to which the rest of their lives is devoted.

This system has given the world valuable results in many fields, and literature is rich with stories of the work of these single-purposed men. Father de Heredia—a Mexican born in Mexico City, and now at Holy Cross College, Worcester, Mass.—has spent his life investigating spiritism and has followed it not so much with the mind of a scientist as with the uncomplicated logic of a boy, for that is the way, he says, to strip spiritism of the frauds commonly practiced in its name. He demonstrated recently in the Popular Mechanics photographic studio how spirit pictures could be made under "test" conditions so that the closest observer could not say how it was done. Using the magazine's equipment, including camera, plates, and chemicals, numerous "spirit" views were produced, even to the white cloud of "ectoplasm" commonly associated with them.

To guard against plates being shifted, they were signed by persons present and Father de Heredia himself sat for some of the views while the magazine's operator made the exposures. The results were as gratifying as any of the pictures exhibited by Sir Arthur Conan Doyle—and yet Father de Heredia did it all by trickery, and willingly explained how.

Father de Heredia discovered how to make spirit photographs quite by accident several years ago. He had been experimenting with some luminous paint and had laid down, temporarily, an object coated with that substance. Upon picking it up, he observed that there remained a faint photographic impression upon a sheet of paper on which the object had rested. This led him to try to transfer a picture directly to a plate by first coating the picture with paint and then laying it

The Illustrated World, a magazine long and favorably known, has been merged with Popular Mechanics. Beginning with this issue, Illustrated World subscribers will receive this magazine each month until their subscription expires. Those who have been subscribers to both will have their subscription to Popular Mechanics extended by the number of months of Illustrated World still due. We welcome our new readers with the hope that they will grow to like this magazine as well as they did the other.

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Prof Joseph Freud, R. 26, 625 W. Jackson Blvd

upon the sensitized surface. Results were obtained with amazing simplicity. Any picture could be transferred to an unexposed plate without affecting its appearance sufficiently for detection, and the plate could then be placed in the camera and exposed in the usual manner. The result when printed was a sharp impression of the person sitting for his portrait with an etherealized presence, or presences—according to the treated copy used—floating in a gauzy cloud near the subject, or even, transparently, across his face.

When a boy, Father de Heredia had studied magic under the renowned Herrmann. The boy's father was wealthy and maintained a private theater for his sons. Here Herrmann had given a performance which so delighted the young Mexicans that they begged to be taught the secrets of the profession. This boyish delight in clever tricks has seasoned the priest's personality and kept him very human. Magic and science are the allies which enable him to make spirit pictures under test conditions.

Professor Freud (Joseffy) and Father de Heredia, Quite Unconscious of the Benign "Spirit" Bending over Them

The priest clips his "ghosts"—a beautiful child, a gliding figure, a line of marching soldiers, an aged woman—from foreign periodicals. He always has a supply with their surfaces washed with luminous paint and freshly exposed to the light. A sitter enters the studio. Perhaps fearing fraud he has brought his own plates and chemicals—or his own camera even. He examines everything relating to his mission. The good father refuses to use the plates until the subject has written his name on them to insure that no shifting can be done. Father de Heredia watches him sign the plate, his own hand—in the palm of which is the paint-treated spirit picture—resting lightly on one corner. The plate is then placed in the camera by the subject himself, who may even press the bulb. The sitter is eager. He insists on developing and printing the plate immediately. His eagerness increases. The print is still wet, but there—unmistakably—is not only his own likeness, but that of the aged mother for whom no normal person ever ceases to yearn.

Fortunate, indeed, for the subject, that the picture was made by the good Jesuit priest, who willingly explains how he did it.

Many and devious are the ways of the fraudulent cabinet medium, according to Father de Heredia. A man may have a hairless chest, but what is there to prevent him from wearing a wig on his chest? Under such a wig may be concealed clouds of fictitious ectoplasm.

An examining committee is practically always restrained by delicacy from making a thorough examination of a medium. Where the medium is a woman, she must have a chaperon—and according to the priest, any man skeptic is helpless when opposed by two clever women.

Let us pass, however, from the demonstrations of the Jesuit to a Corinthian-pillared hall where are gathered several score of people, every one of whom has suffered a bereavement that has left him groping through the hard facts of reality into the shadows of the unseen. If we had time we could read a story into each of these faces. An old man on a low rostrum at the front is announcing such hymns as "Lead, Kindly Light," and "When We Gather at the River."

A group of men at the front are

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Two "Ghosts" Haunt This View of Father Kane of Loyola University and Father de Heredia. They Are Both "Luminous-Paint" Spirits, Evoked by the Jesuit Scientist in the Popular Mechanics Studio

setting up a cabinet which they have carefully examined. The medium herself is in the hands of the examining committee of women; she will soon appear in a coat and skirt borrowed from persons in the audience. The overhead lights blink out one by one. The room now is in semidarkness so that the dope-faced man at the piano looks like a death mask in the gloom. Over the rostrum one blue light gleams. No one quite knows when it was switched on, but there it is like a spiritual eye to oppress any who may doubt.

Father de Heredia, and H. H. Windsor, Editor of Popular Mechanics: The Third "Person" Is the Ghost

The medium stumbles out of the anteroom into the cabinet, the women's committee files silently into the room. The old-man leader has instructed every one on the front seats to clasp the hand of his neighbor on the left and right. Why do some of these people grip one's hand so hard?

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Suddenly a voice—a gruff, loud voice—from the cabinet! It is Pedro, the medium's control. "Watch for Balsamo who lived from 1743 to 1795."

The curtains part, they are swayed by a filmy gust. Heavens! what is this? It is not the usual spiritual figure, but a skull that emerges. A horrid grinning human skull. Pedro speaks again. "Balsamo will answer questions. Three raps will mean 'yes' and two raps 'no.' Is that right, Balsamo?"

The skull opens its grinning jaws and clicks its teeth together sharply three times—meaning "yes." The people are leaning forward breathlessly.

"Balsamo, look about you"—the skull slowly turns from left to right, from right to left—"and see if you know anyone present."

"Click! click!" responds Balsamo—he recognizes no one.

"Balsamo," the Talking Skull, with Its Inventor, Joseffy, at the Left, and the Jesuit Father de Heredia, at the Right

"To prove that Balsamo understands what is said to him, will some one choose two figures from the chart on the rostrum and Balsamo will add them together."

The chart has all the figures from 1 to 9 and some one chooses 5 and 8. The gruesome thing responds with 13 staccato clicks, and a great sigh breathes up from the spectators.

"Is there anyone here who would like to ask Balsamo questions?" calls Pedro. The women shrink back, but a graying man calls out: "Have you ever seen John Patterson on the other side?"

"Click! click! click!" answers Balsamo, turning his hollow eyes upon the speaker, who trembles visibly.

"Can you take a message to him?"

"Click! click! click!"

"Tell him"—with a big sob—"Dad knows he was not a coward."

"Click! click! click!" answers the skull, but where is it?

It has disappeared, and the medium is staggering out into the arms of the waiting committee.

Such a seance is quite possible were Balsamo, the mechanical skull, to fall into the hands of unscrupulous persons. It is the invention of Professor Freud, otherwise known as Joseffy, the Magician.

On the same day that Father de Heredia showed the assembled editors of Popular Mechanics Magazine how to fake spirit pictures, Joseffy exhibited Balsamo, who has been named after a Spanish magician who died in 1795. Balsamo has no visible mechanism of any kind. The head is pivoted on a small circular base and has a three-inch frill of chiffon around its neck. It was passed from hand to hand: There were no connections between it and its control—Joseffy. It was then placed upon a pedestal and not only gave the performance described, but did many other things.

The skull turned either to left or right, as it was directed. Joseffy asked the time; a spectator took out his watch. It was exactly 2:06 p. m. "Click! click!" answered the skull; a pause and then six more clicks in rapid succession.

Every one responds to magic.

There were more tricks. Mind reading; answers from beyond to questions.

"Thought transference?" questioned one hesitatingly.

"Thought transference?" chuckles Father de Heredia; "no, just a trick, but I will not tell you how it ees done. It ees a great secret. Ha! Ha!"

"Ectopiffle!" laughs Joseffy, the wizard.

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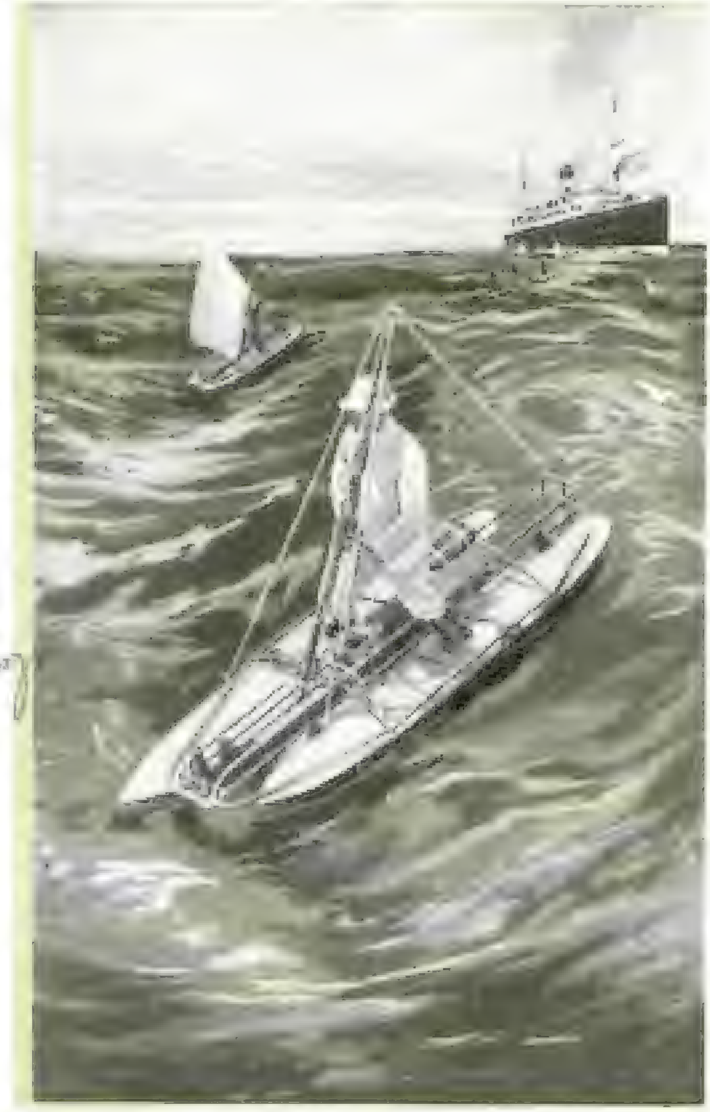
Inv. A. N. Sheldon
Ventura, Calif.

Cont. S. R. Winters
703 District National
Bank Bldg.
Washington, D.C

2038

VICTIMS OF SHIPWRECK MAY WALK OCEAN TO SAFETY

A one-man life-saving device with which shipwreck victims may "walk" to land, is being offered steamship companies. It consists of two pontoons that slide back and forth alternately in a rigid frame, the operator placing a foot in each one, standing erect, of course, and grasping the handles of a steering device. As the pontoons are worked, paddles on the bottom aid the walker, folding up so as to offer no resistance on the forward slide. In windy weather a sail assists the walker.



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Victim of Shipwreck Operating New Life-Saving Device: Paddles on Bottom of Pontoons Aid "Walker"

NEW DUTCH CANAL

2/21

One of the most important canals Holland has constructed, connecting the Zuid-Willems canal, near Helmond, with Geertruidenberg, on the coast near the mouth of the Meuse, was scheduled to be opened for public traffic during May. This new waterway cuts the province of North Brabant lengthwise into two almost equal parts, gives the industrial town of Tilburg an exit to the sea, and makes possible intercommunication between this town and the important Dutch cities, Maastricht and Bosch. Its length is approximately 42 miles, its depth about 8 feet, and its surface width 71 feet. About $10,000,000 has been spent on the project.

Christian Science Monitor
4/10/23

GERMS TRAPPED BY AIRPLANE FIGHTING WHEAT RUST

214

Seeking to find the source of the germs of "black stem rust," a disease of wheat, an airplane has been used within the last year to test the air above the fields. It was not known whether the rust germs were carried to the wheat-raising states from the South by the wind or whether the barberry, a shrub of rapid growth quite common in the wheat belts, served as a breeding place for them. Glass plates, coated with a mucous substance, were mounted on the wings of the airplane, which then flew over infected fields at heights varying from 1,000 to 7,000 feet. The plates were exposed to the air for different periods of time and the results led to the conclusion that the germs were sheltered by the barberry rather than brought from the South by air currents. In one instance 6,800 spores were caught on a glass plate exposed for 65 minutes. It was also learned that the spores would germinate at heights of as much as 7,000 feet above the ground.

¶An exceptionally dry winter has so weakened Japan's electric power, through the drying up or lowering of the level of streams and lakes, that steam plants are being installed to help out.

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View of the Popular Mechanics Pressroom with the Big Rotaries at Work: This Room Has a Floor Space of 10,000 Square Feet, and Every Corner of It Is as Light as Day. This Issue Is the First to be Printed in the New Building. Each Press Produces 384,000 Printed Pages per Hour, Folded and Ready for Binding, Which Is Equivalent to More than 1,000 Complete Books. All Machinery in the Building is Motor-Driven and under Instant Control by Means of Push Buttons Located at Convenient Intervals

2140

POPULAR MECHANICS' NEW HOME

BY H. H. WINDSOR

IN occupying our new building and issuing the first copies from it, we have thought some of our readers would be interested in a few words as to how the magazine was originated and its development.

The first copy of Popular Mechanics was issued January, 1902, from one small room, by its founder and present editor. The idea had been developing in his mind for five years, suggested by reading a large number of other technical and class publications while publishing some of his own. He realized the enormous number of articles of a highly interesting and instructive character, including science, mechanics, engineering, industry, and discovery, which were expressed in technical terms that the layman could not understand, and limited to the comparatively small circulation of such publications in those days.

Office of H. H. Windsor, Editor and Founder of Popular Mechanics Magazine, on the Day of the Formal Opening

The Popular Mechanics idea was to secure this information at first hand and at the earliest possible moment, and concisely tell the story of these events in language "written so you can understand it"; the "you" meaning everybody in all professions, industries, and occupations.

The first copies contained 16 pages in the form of a weekly, which two years later was changed to its present monthly-magazine size. From the first it was liberally illustrated, although at that time few publications indulged in many pictures.

A long-time policy is an absolute independence of the editorial and advertising departments. Readers frequently inquire why the name of the inventor or manufacturer of something described is almost never printed. It is to avoid even the appearance of advertising in the editorial pages.

The Office of the Vice-President, H. H. Windsor, Jr., Also Taken on the Opening Day: The Eastern End of the Room is Seen in This View

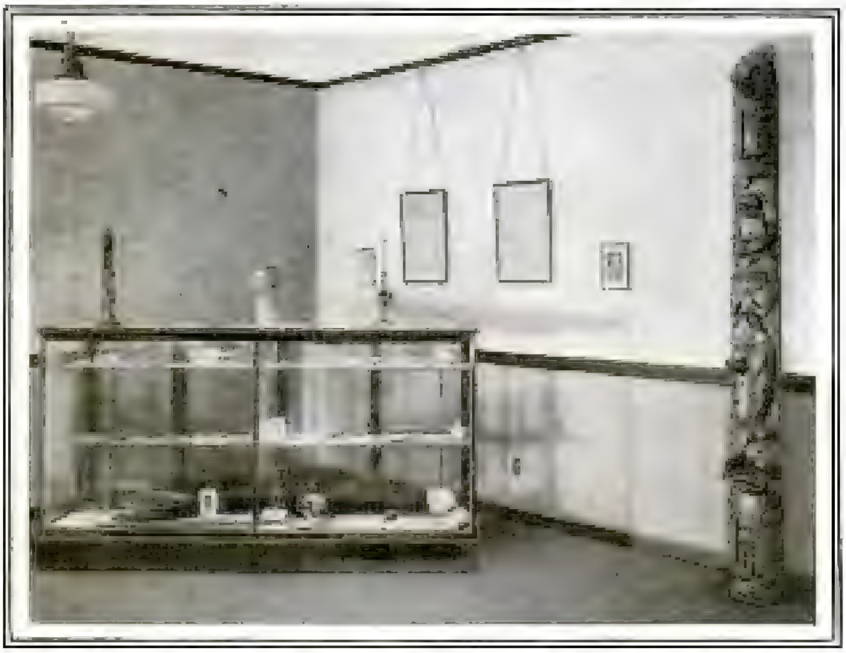
This first small room, however, was soon outgrown, and from that day to this, the space required in which to produce the magazine has been steadily increased, until its present seven-story home became necessary in order to properly produce the publication.

The Popular Mechanics building occupies 85 by 120 feet, on a lot 120

2140

by 165 feet located on the northeast corner of Ontario and St. Clair streets, Chicago. It is devoted exclusively to our offices and printing plant.

The basement of the building is used as a storage space for paper and provides room for 2,000,000 pounds.



A Corner of the Museum Floor of the New Building: The Collection Has Many Exhibits of Rare Interest

The first floor is used as a pressroom and was built especially for that purpose. The height from floor to ceiling is 15 feet, which allows ample space over the presses. The presses used are rotaries.

The second floor contains the bindery where the magazine is assembled after printing, the book stitched, and the cover glued on. This is done entirely by machinery.

The third floor is occupied by the advertising, subscription, and mailing departments. The general reception room is also located on this floor.

The fourth floor comprises the general administration, book, and cashier's departments. There is also a museum which is rapidly becoming of considerable interest as a permanent, fireproof resting place for what have been, in most cases, cherished family heirlooms. These are mounted on the walls or displayed in show cases, each article accompanied by a card bearing the name of the donor, with a brief description of its history. The public is invited to inspect the museum at any time during business hours.

The fifth floor is devoted to the editorial department, the bureau of information, and the library. The bureau of information gladly answers any inquiries regarding articles in the magazine, as well as furnishes any other information in its power, with absolutely no charge. The editorial department is so laid out that each writer has a room to himself.

Our art department on the sixth floor, in its arrangement and equipment, is among the finest in this country, the photographic branch being particularly complete. Something over 75,000 illustrations have appeared in our pages since the

North Bay West Bay
of the Art Department on the Sixth Floor, as Seen from the Art Director's Office

Copyrighted material

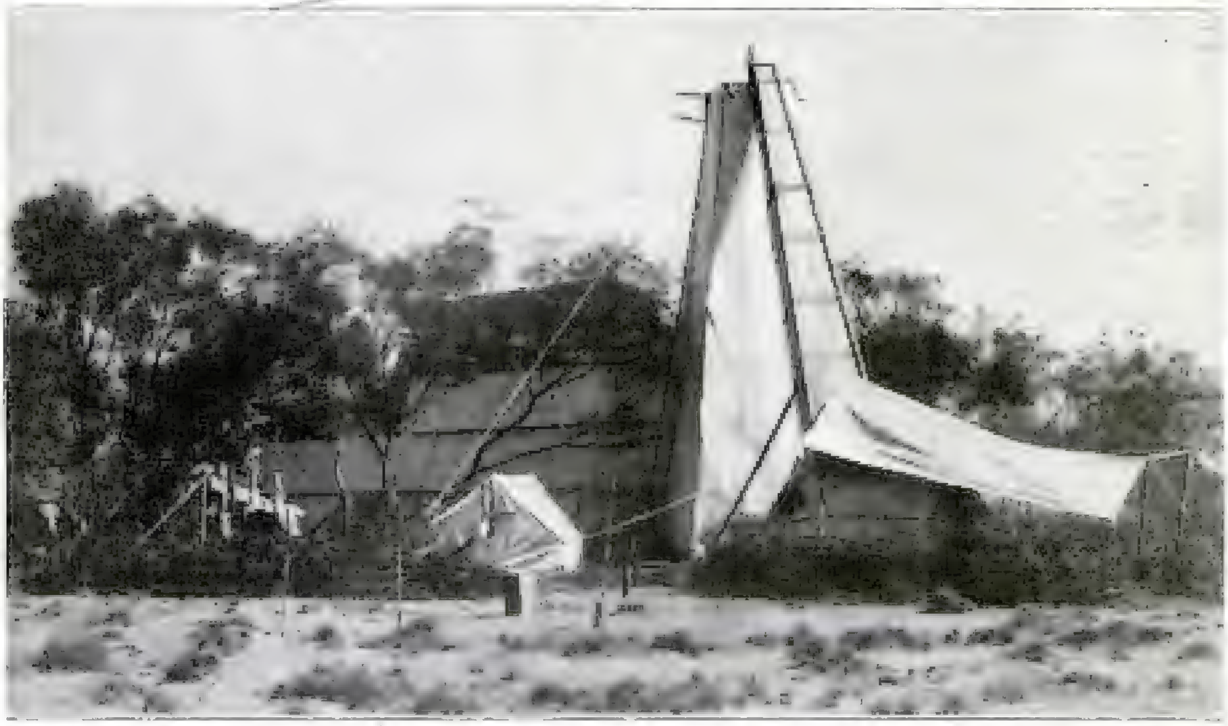
Prof. W. W. Campbell, Director
Lick Observatory

first copy of the magazine was published. The building is fireproof throughout, being constructed of brick, steel, concrete, and tile. It was completed in 10 months, by Marshall & Fox, the architects and builders. At the formal opening recently, over 700 guests inspected all departments.

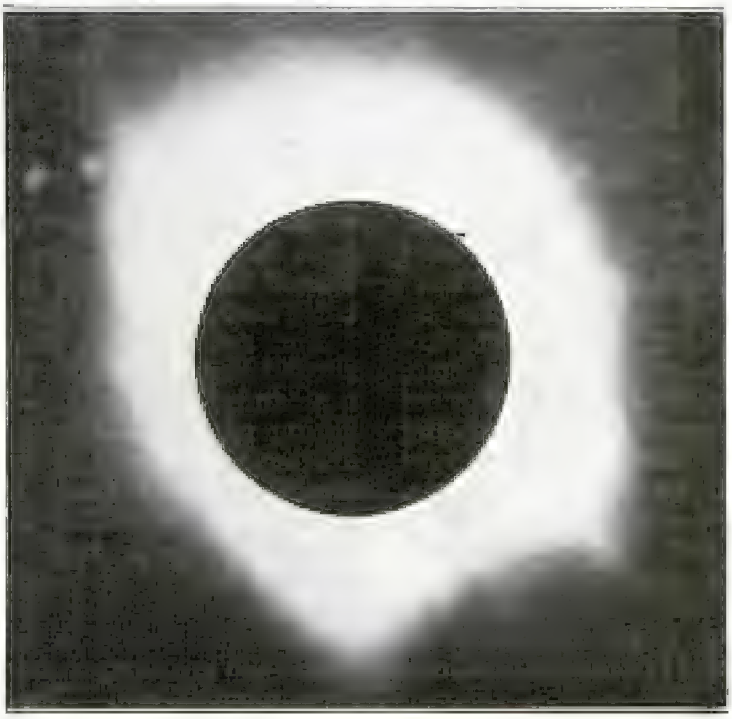
It is the policy of the magazine not to indulge in special editions, nor to announce forthcoming features. Our effort is to try to do each month at least a little better than the one before; it should be no violation of policy to say we hope to at least live up to this endeavor. When in Chicago, our readers will find a warm welcome, and a guide to take them through all departments of the making of a magazine, should they honor us with a call.

2159

CROCKER ECLIPSE PICTURES SHOW SUN STREAMERS



Above: The Huge Camera Erected in the Wilds of Australia by the Crocker Expedition for Photographing the Eclipse of the Sun



Left: Total Eclipse of the Sun as Seen by the 40-Foot Camera: The Corona Is the Band of Light Seen About the Dark Circle

First photographs of the sun's eclipse last September, obtained by the Crocker expedition to Wallal, West Australia, were recently shown the public. The pictures were taken with a 40-foot camera and furnish evidence that Einstein's predictions were correct. These photographs show the sun's corona to have been 40,000 miles wide, from which long streamers of light shot forth, one extending 2,500,000 miles from the sun's center. More than 30 stars were recognized on the camera plates and 23 of these were measured,

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2131

NEW METHOD OF PURIFYING HELIUM PROVIDES AID FOR "ZR-1"

BY JOHN W. KEAN

Bureau of Navigation Navy Dept, Washington D.C.

ENGINEERS of the Bureau of Mines have devised a new method of purifying helium which will be a great aid to the safe and economical operation of the "ZR-1," the navy's new American-built rigid dirigible.

In this new charcoal-adsorption method, as worked out by Doctor Moore, of the Bureau of Mines, impure helium is passed through a bed of coconut charcoal maintained at a temperature of approximately 312° below zero Fahrenheit. In passing through the cold charcoal, all of the impurities, which are principally oxygen and nitrogen, are adsorbed, and the helium that is drawn off from the apparatus is within .1 per cent of perfect purity.

The removal of the impurities is an interesting engineering and chemical process which is made possible by the adoption of liquid air for the refrigerating medium. If liquid air is held in an open container, it will boil quite vigorously and the vapor produced thereby is practically at the same low temperature as the liquid.

In the process as developed by the Bureau of Mines, this cold vapor is needed to cool the incoming impure helium and also to cool the coconut charcoal and its container. With the charcoal and the incoming impure helium at the temperature of liquid air, or thereabouts, the helium is caused to pass up through the charcoal bed under a pressure of about 15 pounds to the square inch, and under these conditions, the charcoal has the property of removing and holding all of the impurities and allows the pure helium to pass off through the apparatus. On warming up the charcoal cells, this adsorbed nitrogen and oxygen is driven off, and the cell is ready to be cooled down for another purification run. By means of a number of these cells, properly connected, the process is made a continuous one.

Interior of Power Car of Railroad Unit Equipped by Bureau of Mines for the Purification of Helium

Helium in balloons or dirigibles is slowly contaminated by the diffusion of air into the envelope, and purification at intervals, depending upon the nature of the airship, is necessary as a measure of economy and also to conserve the supply.

At present the government plant at Ft. Worth, Tex., is extracting about 450,000 cubic feet of helium per month from the natural-gas wells in that vicinity, at a cost of approximately $80 per 1,000 cubic feet. After the helium has been used for inflating a gas bag and has become mixed with oxygen and nitrogen and other impurities, it can be restored to its original condition at a cost of approximately $1 per 1,000 cubic feet.

In constructing and preparing for the flights of the "ZR-1," the navy engineers are taking every precaution for safety. While the Bureau of Mines has been working on the helium problem, the National Advisory Committee for Aeronautics has been checking the plans for the big ship.

These precautions have been taken because it is fully realized that an accident to the "ZR-1" will be a very severe setback to further construction of this type of air craft. Owing to the tragic accidents that have happened to the big airships purchased abroad, there is a feeling of distrust among people for this type.

The accidents to the ships purchased abroad have been due to faulty construction and the use of hydrogen as the inflating element. From the day the first draftsman put pencil to paper, the navy engineers determined that no accident would happen to the "ZR-1" from either of these causes.

The big ship is nearing completion at Lakehurst, N. J., and is expected to make its first flight early in July. It is 680 feet long—125 feet longer than the Washington monument is tall. The greatest diameter

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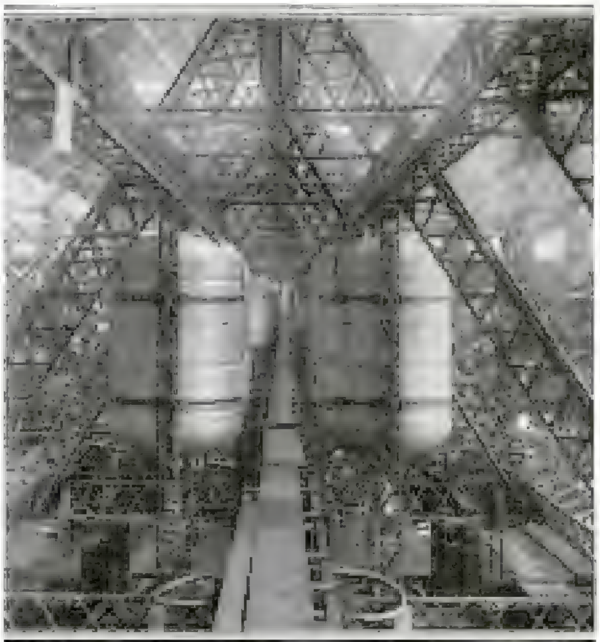
Artist's Sketch, Showing the Nearly Completed Airship "ZR-1" Making a Landing at the Naval Air Station at Lakehurst, New Jersey

is 79 feet, and the gas capacity is 2,100,000 cubic feet. This gas will be held in 20 separate gas cells or bags. A skeleton framework of an aluminum composition incloses these bags. They are lined with gold-beater's skin and, under ordinary conditions, are gastight. Along the keel of the ship are quarters for the crew and tanks for the water ballast and the gasoline.



Looking through the Keel of the Partly Finished Giant Dirigible, the "ZR-1," being Built at the Lakehurst Naval Station: Note the Gasoline Tanks to the Right and Left of the Keel

Six engines of 300 horsepower each, in six separate cars swung beneath the ship, will furnish the motive power. These engines have been given continuous speed tests of eight hours' duration and are scheduled to drive the big ship at a speed of 60 miles per hour. The plans call for a continuous flight of 50 hours, which would take the ship across the United States or across the Atlantic. The "ZR-1" will be closely observed and handled with diplomacy before being called upon to make any spectacular flights.

AIR PHOTOS MADE OBLIQUELY IN CANADIAN SURVEY

In order to save time in covering the great distances of Canada, new methods of aerial photography have been adopted in making recent surveys. The photographing is done straight ahead from the nose of the machine, pictures being taken to the right, left, or to the front as desired. An advantage of this method is that it allows an area up to fifteen square miles to be shown on each picture, instead of only an area of three-quarters of a square mile as formerly. The adoption of this method followed a demand for more exact information regarding the Mackenzie River region arising since oil was discovered at Fort Norman. The work of surveying Canada has gone on slowly since the early French settlement.

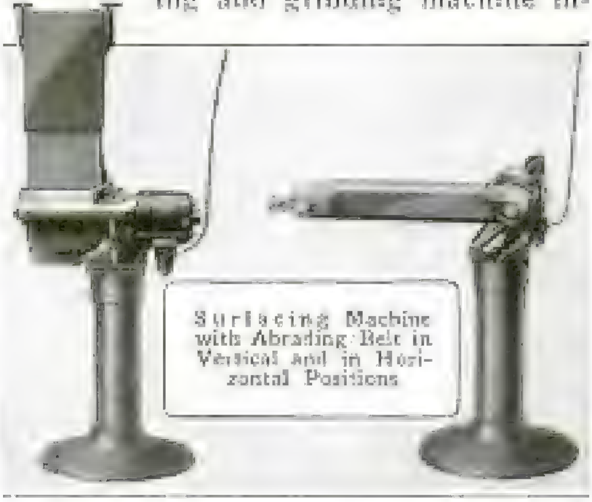
London Times 4/12/23

The Porter Cable Machine Co.
1708 N. Salina St.
Syracuse, N.Y.

SURFACING MACHINE USES ABRASIVE BELTS

2102

Interesting features of construction are embodied in an improved type of sanding and grinding machine in-



Surfacing Machine with Abrading Belt in Vertical and in Horizontal Positions

tended for small wood or metal parts. The grinding surface is an abrasive belt, easily adjustable and replaceable, which can be pivoted about its lower roller shaft and set in any position between vertical and horizontal limits. A stationary dust hood and a removable guard add to the safety of the unit. The working table, 9 by 16 inches, can be tilted up as high as 15°, and down to an angle of 45°, making it adaptable for work where faces of the material are not square with each other. The table is at a convenient height from the floor, permitting work to be handled with ease.

FRENCH HAVE NEW SYSTEM OF TENNIS SCORING

2166

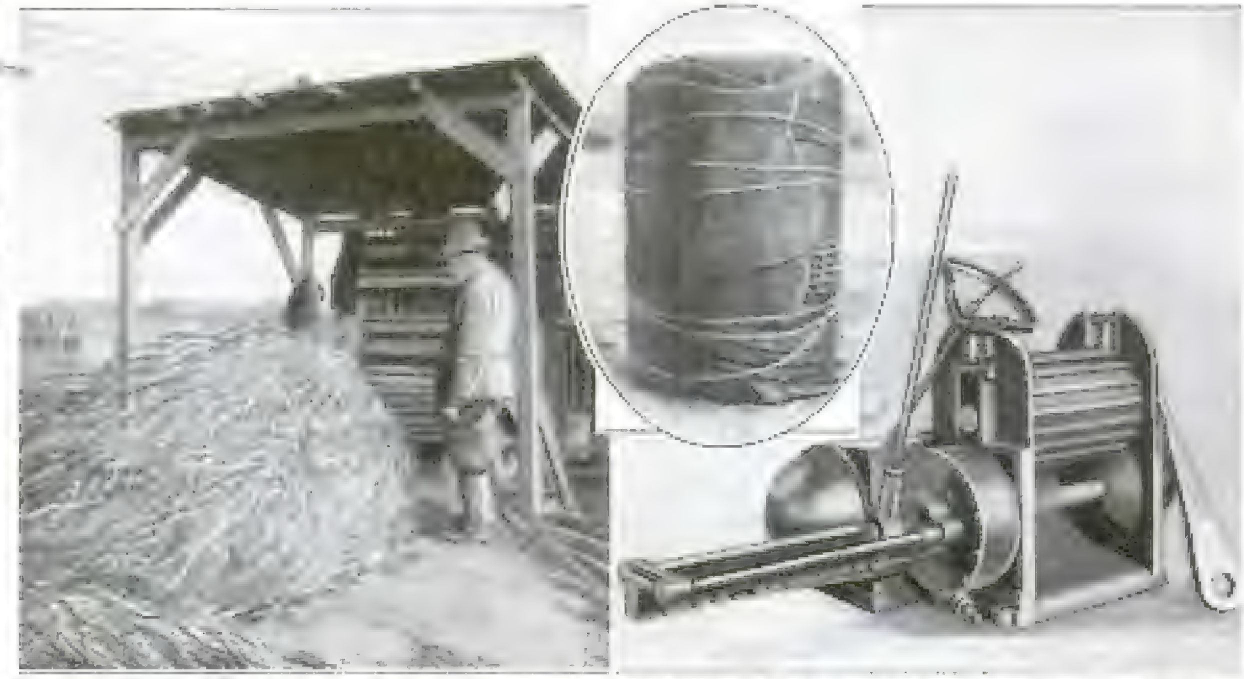
In view of the fact that the present method of scoring in the game of tennis is quite clumsy, especially in match tournaments, the French have devised a new system, the principal object of which is to end long-drawn-out contests. Instead of requiring six games to win a set, the French would have the set go to the player who first won nine games, while deuce sets—those in which neither player scores—would be done away with. Further, matches should be the best two of three instead of the best three of five sets. In this way no match could consist of more than 51 games.

Manchester Guardian 4/13/27

BUNDLING MACHINE MAKES SCRAP-METAL BALES

2106

Circular bundles of scrap are made by a machine that has novel construction features. The scrap metal, which may consist of tangled wire, bed springs, tubing, or similar material, is wound around a revolving mandrel. As the bundle is formed, pressure is applied on its outer surface, but the full power of the machine, five horsepower, is required for only a few minutes, when the bundle is within 1 inch of the full size. Rotating disks at the ends of the mandrel absorb much of the wear that would otherwise fall on the frame. A winch is provided on the bundler, to haul the scrap from delivery wagons to the front of the machine.



Left: A Mass of Tangled Wire being Drawn to the Machine for Bundling. Right: Close-Up of the Bundling Machine. Insert: A Bundle of Scrap after Leaving the Machine

Samuel H. Garrett
234 N. 13th St.,
Philadelphia, Pa.

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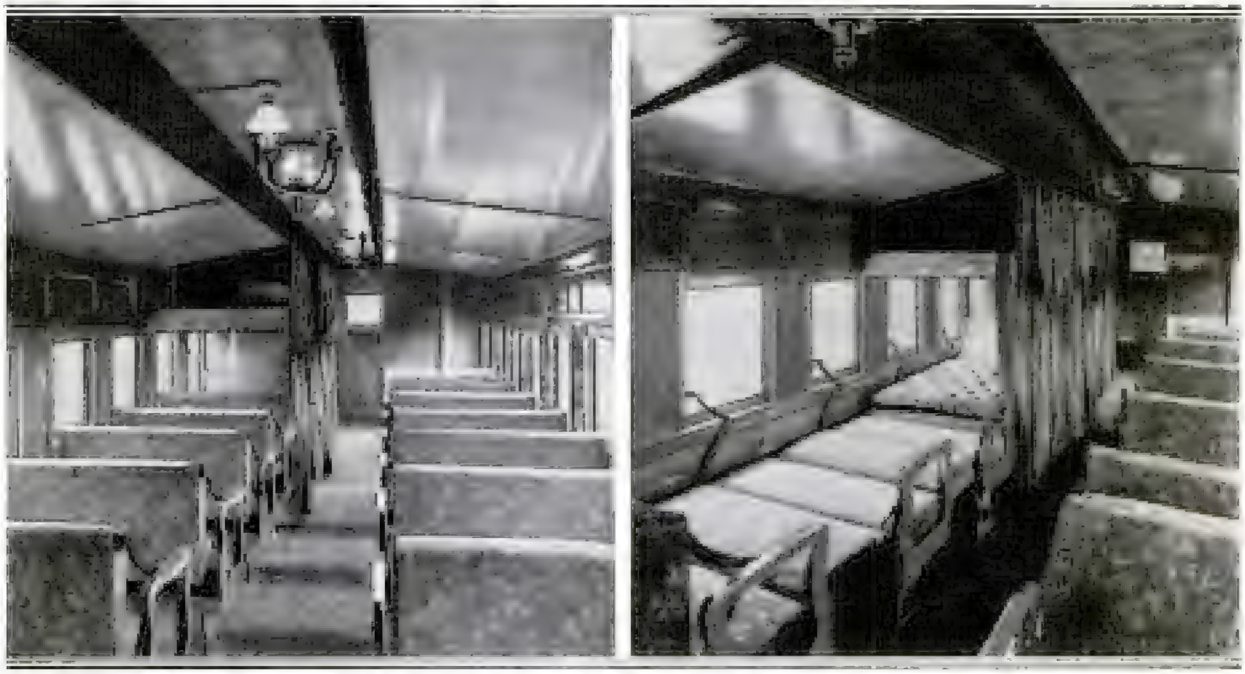
2110 Pullman Company



Two Views of the Interior of "Old No. 9," the First Sleeping Car: That at the Left Shows Its Daytime Guise; While at the Right It Appears with Berths Partly Made Up

FIRST "PULLMAN" CAR FEATURED IN MOVIES

In connection with an office survey of the growth of a sleeping-car concern and the great advancement made in the construction of its coaches, a moving-picture film has recently been completed. For the purpose, "Old No. 9," the original car, which made its first trip on Sept. 1, 1859, from Bloomington, Ill., to Chicago, was featured, and a story, built about the early public attitude toward the innovation, was concocted, employing the services of a number of actors. The old car carried a sign requesting passengers to "Please Remove Boots before Retiring"; seats were not cushioned; the berths were pulled down into position by means of ropes and pulleys; heat was scantily supplied by a wood-burning stove, and illumination was by candles. At night the seats and backs were adjusted so as to form one long bed, and the sections were subdivided by curtains. A great deal of adverse comment was made at the time because of the narrowness of the aisle, which made it difficult for the women, who then wore hoopskirts, to negotiate its length. Similarly, the men complained because the prevalent "stovepipe" hat was frequently knocked off by the suspended lights and the low ceiling, which latter was covered with oilcloth. The uncushioned seats were reversible. The vestibule idea not yet having been developed, the doors at either end opened directly onto the platform. It was nevertheless termed the "Palace Car," although "Sleeping Car" was the name appearing on the outside. On its initial trip the "Old No. 9" carried only five passengers and was in charge of Conductor J. L. Barnes, who died recently.

Railroad Travel in 1859 Was Not an Unmixed Blessing; Witness This Picture of the First Sleeping Car

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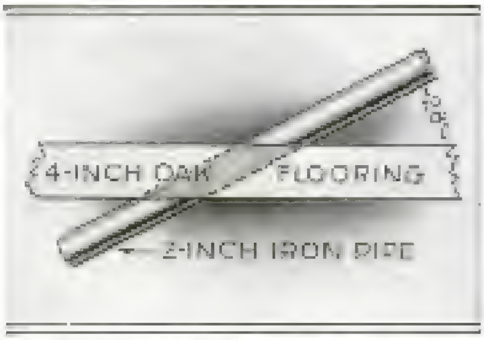
WHAT GOES UP—COMES DOWN

BY FRANCIS W. WILSON

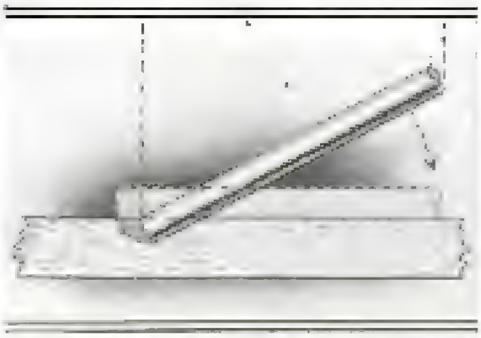
If you stood looking at a substantial brick building about 150 feet distant, and as you looked the brick walls, windows, and roof dissolved—in a split-second—into a cloud of dust and smoke which shot skyward, you would probably "register" surprise of a degree that would delight even the most exacting motion-picture director.



Sketch Showing How Iron Pipe Cut through Four-Inch Oak Floor of Flat Car

The building, as I first viewed it from a window of the drafting room, housed two quite substantial boilers. One of these "blew up" as I looked.

When the patter and smash of falling things had ceased, I noticed the remarkable clearness of the window glass in front of me. I put out a hand—there was no glass! The force of the explosion, acting away from the office building, had created a vacuum that sucked out every pane of glass on the side of the building I was in. Powerful as this suction must have been, I had felt no effect from it, though I stood within 3 feet of a window.


If the Pipe had Fallen Vertically, the Effect would have Been as Shown Above

During the noon hour the bridge shop was deserted, and therefore, there was but one casualty. The fireman was alone in the power house, and not a remnant of his body could be found after the disaster.

The twin boilers had been bedded in brick masonry, and the terrain exposed to the full force of the explosion suffered a bombardment from bricks and bits of iron. Scattered about within this area were frame cottages. Fourteen bricks tore through one such house, but did not injure a woman and girl who were in it.

Traveling with a Rotary Motion, the Pipe would have Made a Hole Similar to This

The oddest freak of all, from a mechanical point of view, was afforded by a piece of iron pipe which landed on an empty flat car that stood in the shop yard, halfway between the power house and the office building. Half of its 30-inch length projected through the 4-inch-thick oak platform of the car.

The pipe landed approximately 75 feet from the site of the explosion. It might have ascended to a great height, or perhaps was projected almost horizontally. In either case it struck the car with tremendous force; otherwise it could not have cut a clean core of seasoned oak from the floor.

I measured its inclination, which proved to be about 28° from the horizontal. If it fell from a great height and struck the car at this angle, how could it punch a hole through the floor? Falling from a height, its descent would have been almost vertical, since it landed so near its starting point. In that event the result would have been to simply scoop out a dent in the floor if it landed at an angle.

If it fell with a rotary motion, the punched hole could not possibly have been neatly cut, but would have been more or less torn in the direction of the plane of rotation. If the piece of pipe were shot from the power house in an approximately horizontal direction, and with sufficient force to punch through the car floor, its trajectory would have been almost flat in the short distance traveled, and contact with the floor of the car could not have stopped its flight.

I have never arrived at a satisfactory solution of this odd problem. For a number of years I kept the core of wood which was removed from the interior of the pipe. The sheared edges were clean-cut and smooth. Fortunately nothing fell on the roof of the building in which I stood.

Copyrighted material

2103 Purdue University Engineering Experiment Station, West Lafayette, Ind.

STRIKING ELECTRICAL EFFECT ON HIGH-VOLTAGE LINE

THE sleet-covered appearance of the wires in the picture is due to an electrical phenomenon known as the corona effect, which is one of the factors that work against the use of higher voltages in the transmission of electric power. The line illustrated carries 600,000 volts, and was built for studying this effect and the spacing of the conductors. It was necessary to use transformers of special design in the production of this extremely high voltage, and, similarly, insulators of special design in the construction of the line.

2128

LEAKING SEWER WRECKS CITY STREET

A CAVE-IN of unusual proportions occurred recently in Philadelphia, letting down half a block of city street, and almost wrecking the rows of houses on either side. It was an old 14-foot brick sewer that broke down, the collapse taking place on the morning following a heavy storm. It is believed that the excessive flow of storm water increased its defective condition, so that the resulting leakage washed away large quantities of surrounding material and left the pavement slab unsupported. The noise of the cracking of the slab before it collapsed averted possible loss of life, warning, as it did, a number of boys who were playing in the street.

Cont. John J. McCarren ... Penn. Club 026 Walnut St. Philadelphia

2053 Inv. Jesse W. Reno, New York City

DEEP-SEA SALVAGING CAISSONS TESTED

WHILE the idea of raising sunken vessels from the floor of the sea by means of devices embodying the principle
attached to—few, if any, have proved of sufficient practical value in actual operation to warrant widespread
sunken ship, since divers cannot work or even live under the great pressure of such depths, and a diving bell of
Now, however, the testing out of a system, long under trial, has resulted most satisfactorily, although the recently
the pontoons to reach the surface that they tore out sections of the vessel's sides—$\frac{1}{16}$-inch plates—in their upward
tractorlike machine which is supplied with air by an internal system and with electricity by means of cables from the
and 12 feet high, is a steel drill. The machine is moved up to the sunken vessel and the drill applied to its sides. A
on both sides, the pontoons are lowered into place. These pontoons are steel cylinders, 12 feet in diameter and 25 feet
through which the air is pumped to give them their lifting power. They are braced inside the "bell." At the bottom
through the valve into the caisson by the mother ship, which results in such an upward pull that only eight were
Island Sound—had the plates held. The left-hand part of the picture shows the artist's conception of the action of the
into the air under its impetus. On the right appears the tractorlike diving bell, the chains by which it is lowered to

Reno Marine Salvage Corp. 2053
261 Broadway

SUCCESSFULLY ON SUNKEN "EAGLE" BOAT

New York City

International

of a balloon—a chamber filled with air, which, of course, tends to rise to the surface, pulling with it whatever it is
adoption by salvagers. One of the principal troubles has been the inability to attach the apparatus to the hull of the
sufficient strength could not be readily handled.
reported test itself was not successful in one way. This situation was brought about by the fact that so eager were
surge. The difficulty in regard to pressure at the sea floor is overcome in this system by an electrically operated
mother ship. Projecting from the tractor, which is operated by and carries three men in a caisson, 7 feet in diameter
series of holes are bored in pairs through the plating of the ship. When a sufficient number of holes have been bored
long. The cylinders are open at the lower end, while the upper end is fitted with a heavy cap carrying an air valve,
are hooks attached by chains. These hooks are inserted in the holes in the boat's side. The air is then pumped
used in the recent test, fully demonstrating their ability to lift the 300-ton vessel—an "Eagle" boat sunk in Long
pontoons used in the test, as they tore sections of the vessel's sides loose and rushed to the surface, one leaping 25 feet
the ocean floor and later raised to the mother ship's deck being seen extending upward from the top of the cylinder.

PERMANENT HEADBOARDS AID SLEEPING-CAR PRIVACY

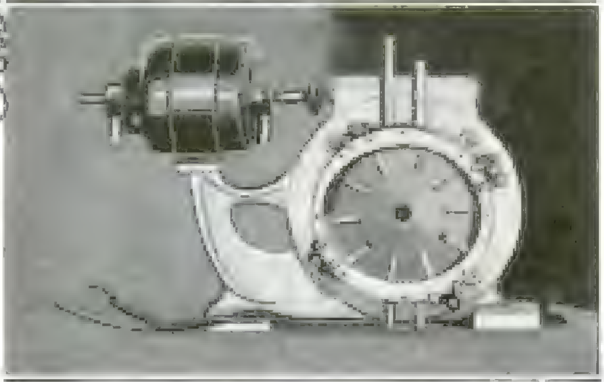
Seeking to increase the privacy of sleeping-car passengers during the day,

New Headboards as Installed in a Sleeping Car: At Night a Removable Half Headboard is Added

experiments are being conducted with permanent headboards erected on the principle of a rigid partition between the seats. The innovation, already installed on nearly 100 standard cars, has the further advantage of permitting the occupant of one section freely to control ventilation at his seat without causing drafts to blow on other passengers.

HIGH-VACUUM AND PRESSURE PUMP COMBINED

A small pump of unusually neat design provides, with one rotor and a single casing, high-vacuum and pressure service such as is required in surgical

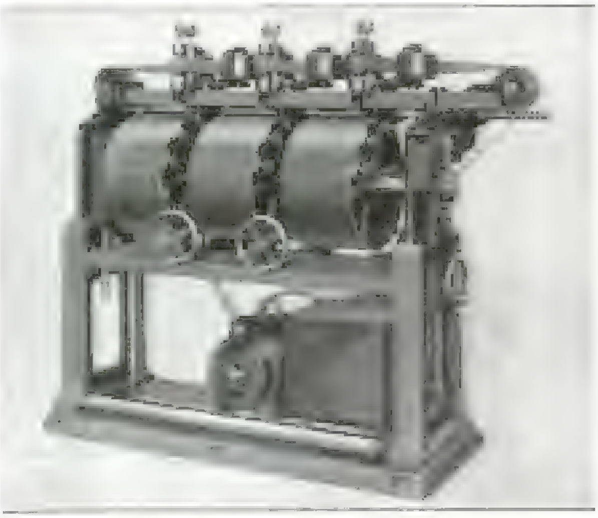


View of Compact Pump, Exposing the Rotor That Creates High Vacuum and Pressure at the Same Time

work. The circular rotor turns in an oval chamber, leaving a space on either side. In one of the spaces vacuum is created, and in the other, pressure developed. Brass plates, fitted with wedges that automatically compensate for wear, are set into radial slots in the rotor in such a manner that, under centrifugal action, a tight joint is maintained with the casing when the pump is running. The pump forms a unit with the motor, by which it is driven through a gear.

MACHINE ROUTS ELECTROTYPE PLATES THREE AT A TIME

A machine has been developed that routs out the dead metal from three electrotype plates simultaneously. Its use is in preparing curved plates for rotary printing presses. The machine is equipped with three drums on which are mounted the plates, which must be exactly alike, and which are movable up or down and from side to side under the control of the operator. The operator guides the movement of the center one of three power-



Machine Which Removes the Dead Metal from Three Curved Electrotype Plates at Once

driven routing tools, which are mounted on spindles in such a way that the work is duplicated on the two other plates.

¶Engineers have disclosed, through surveys of mechanical processes in industry, that lighting is the principal source of fatigue among workers. To the influence of bad lighting these engineers lay a loss of 20 cents a day for each worker, figuring this sum as the cost of lower efficiency. This would mean a loss of about $2,500,000,000 a year in the United States.

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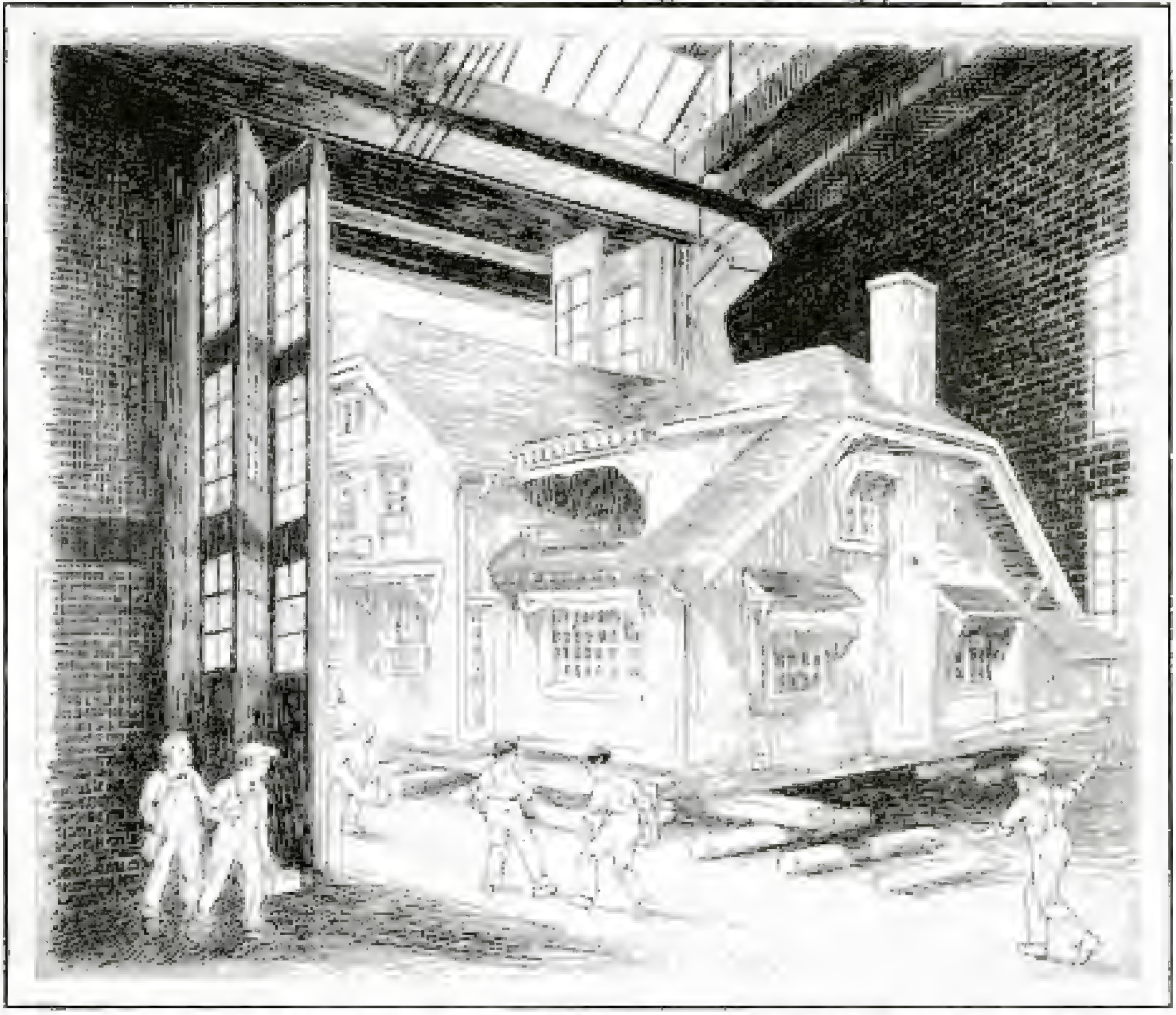
1924 Architects. H. W. + E. B. Clarke, Omaha, Nebr.



The Artist has Copied the Interior of Omaha's New High School in the Room Devoted to Manual Training and has Shown How a Complete Bungalow Built by the Pupils may be Moved Out of the Building to be Disposed of as a Home

PUPILS BUILD BUNGALOW WITHIN SCHOOL

IN the new Technical High School at Omaha, Neb., the pupils will be given the unique experience of building a complete bungalow, "life-sized" and ready for occupancy, the entire construction taking place within the high-school building itself. The task will be undertaken as much to demonstrate the high-grade equipment of the school as to teach the young carpenters their work.

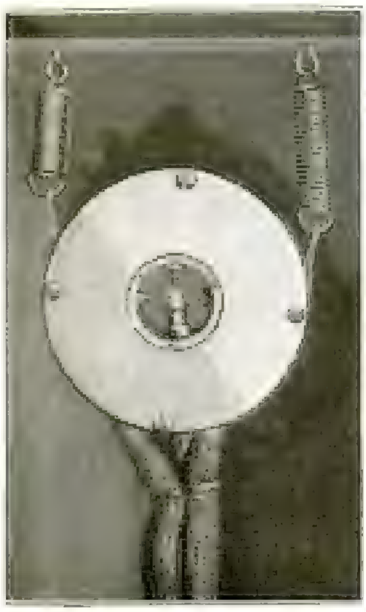
Doors large enough to permit the pupils' structure to be moved out of the building on rollers and disposed of for a real home have been provided. Those who are authorities on the teaching of children declare that this method of instructing them arouses their interest a hundredfold as compared with that they display in building miniature houses and other articles.

The school is planned throughout on this life-sized idea. In the automobile department, a 3-ton crane has been installed to enable the students to work on real automobiles. In these shops all the tools used by mechanics in garages, and many of the new inventions, are available, so that the pupil will in reality have a thorough grounding in these trades when he finishes the course.

Other features of the building include classes in salesmanship, where all the working parts of a department store are in use, even to the cash-carrier system of overhead wires and cages.

In the auditorium, which will seat 2,000 persons, an arrangement of the moving-picture machine and screen has been made whereby there will be no distortion of the pictures shown. A cafeteria, a kitchen, an orchestra room for concerts, a library—in short nearly everything found in the lives of grown-ups—is provided in this remarkable institution.

DIAPHRAGMLESS TRANSMITTER IMPROVES BROADCASTING



A new transmitter for radio makes possible the broadcasting of music and other sounds with more of the original purity. This clearness is attained by eliminating the diaphragm, which, because of its inertia, is incapable of vibrating in sympathy with all parts of the range of audible sounds. In the new transmitter the mechanical disk is replaced by a minute electrical discharge which flows between two points, separated by a very small air gap. This discharge is affected by sound waves, but, having no perceptible inertia, it responds equally well to all vibrations, whether they are caused by high or low notes. The device is about the size of a large watch, and when in operation, a point of light can be seen, caused by the flow of electric energy against one of the terminals.

PORTABLE BAND SAW CUTS WOOD AND METALS

A small portable band saw has recently appeared on the market that will accommodate itself to the cutting of almost every kind of material by a quick change of blades. A change of speed is provided for cutting hard metals like iron and steel. The table, which tilts up to an angle of 45°, is mounted on a quick-acting saddle. It is designed for use on benches like those found in pattern and model shops, tool rooms, and trade schools.

AUTOMOBILE AIDS SINKING OF MINE SHAFT

An interesting example of the marked contrast between the methods of modern prospectors and those of a generation or even a decade ago, is found in the work of a contractor who recently agreed to sink a mine shaft for a western syndicate at Goldtown, Calif., then the scene of a gold rush. Finding the delivery of the mining equipment he had ordered delayed, the contractor decided to use his automobile engine to aid in the work. Hitching a cable, which passed over a block and tackle, to the front of his car, he found it was easy to haul up the buckets of material from the shaft. The car faced the shaft and backed away from it in pulling up the containers, which weighed, loaded, 400 pounds each. A smooth path was thus worn in the desert sand.

This View Illustrates the Resourcefulness of a Western Contractor, Who Used His Car for Hoisting Bucket Loads of Gold Out of a Shaft. The Method was Adopted After a Hand Windlass had been Tried and Found Wanting

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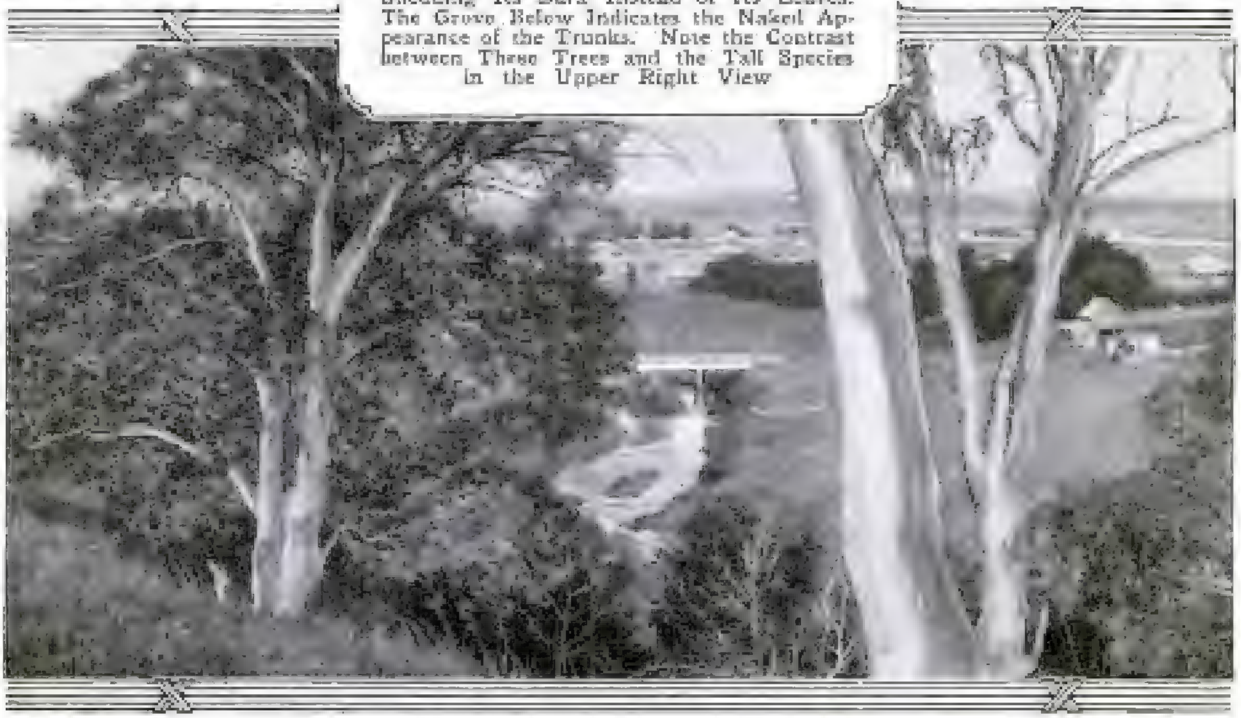
678 Data missing

QUEER TREES OF THE ISLAND CONTINENT

The Bottle Tree of Australia: It Is Not of Great Height, but of Very Wide Girth

The Typical Views Above and Below Show Some of the Peculiar Trees to be Found in Australia. The Circular Insert Is a View of the So-Called "Canoe" Tree, from Which the "Blackfellows" Cut Bark for Canoes. The Eucalyptus, Found in Great Numbers and Varieties, Is an Evergreen, Shedding Its Bark Instead of Its Leaves. The Grove Below Indicates the Naked Appearance of the Trunks. Note the Contrast between These Trees and the Tall Species in the Upper Right View

The "Timber Getters," Cutting Down One of the Tall Species of the Eucalyptus Family



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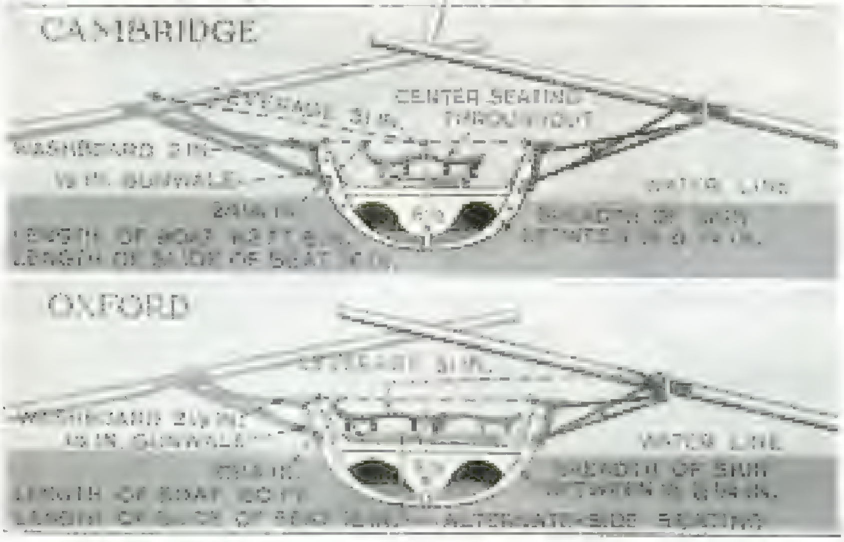

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A Comparison of the Principal Dimensions of the Oxford and Cambridge Shells: The Lower One, Oxford's, Has Alternate-Side Seating

OXFORD RACING CREW MAY HAVE NEW BOAT MODEL

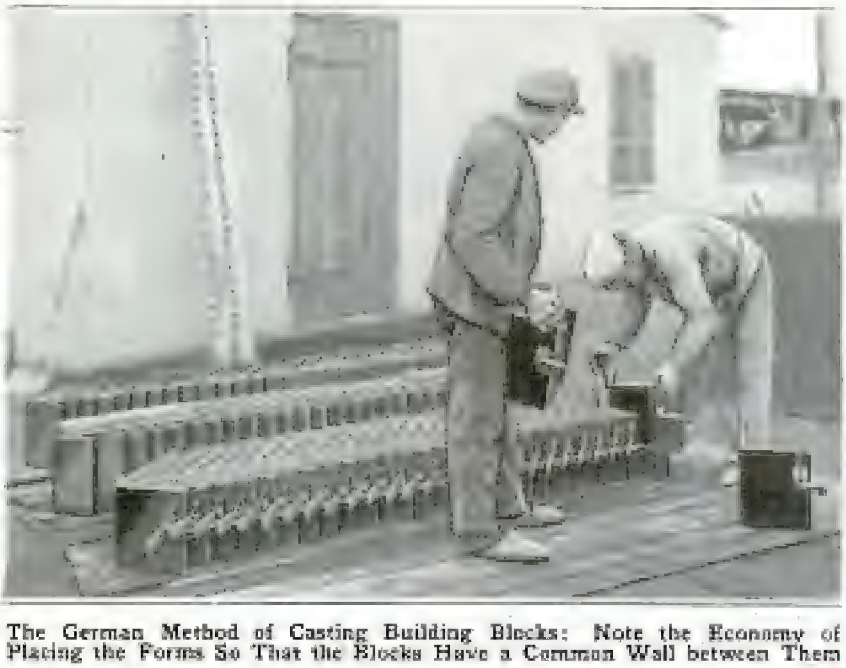
A new racing boat is being considered by the Oxford University rowing officials, which may supplant the design hitherto used. One of the changes considered is a greater freeboard, since it is thought the present model ships too much water. A radical change, however, is the proposal to arrange the four center seats alternately right and left, instead of in the middle.

CHAIN OF GIANT RESERVOIRS URGED FOR RIVER SEINE

New plans are continually being made looking toward the control of the Seine in time of flood, when the rise of the waters endangers the communities along its banks, including the city of Paris. Among the latest of these is a scheme calling for the erection of 23 huge reservoirs along the banks of the river which would have a combined capacity of nearly 70,000,000,000 cubic feet, and it is estimated that, even should the Seine rise almost to its record flood height, the reservoirs would serve to reduce such a rise by one-half. They would also be able to hold a reserve supply of water during the dry season when the lowering of the Seine hinders shipping. Another use would be in irrigation, and by building power stations at the entrance to the reservoirs, 300,000 horsepower could be developed, it is believed.

PRECAST TILES MAKE FOR ECONOMICAL BUILDING

A new way has been found to reduce still further the cost of building construction in Berlin. L-shaped tiles are used to form hollow walls, the long legs of the "L's" forming the wall faces, while the short legs act as distance spacers between the walls. The tiles are precast in steel forms, about 30 at a time, so that the exterior faces of each form are also the interior faces of the next adjoining one. Suitably placed lugs on each form lock with those of its neighbor, providing even spacing, preventing any shifting of the individual forms with respect to each other, and so preserving uniformity in the blocks. The blocks, of course, may be surface-treated for smoother appearance.



The German Method of Casting Building Blocks: Note the Economy of Placing the Forms So That the Blocks Have a Common Wall between Them

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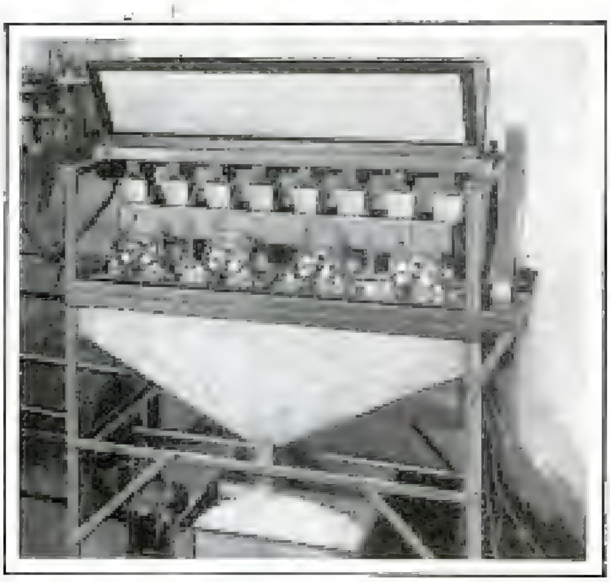
2091. Photo Electric Bean Grader Co. Ithaca, Mich.

WONDERFUL SELENIUM "EYE"

Sorts Bad Beans from Good with More than Human Accuracy

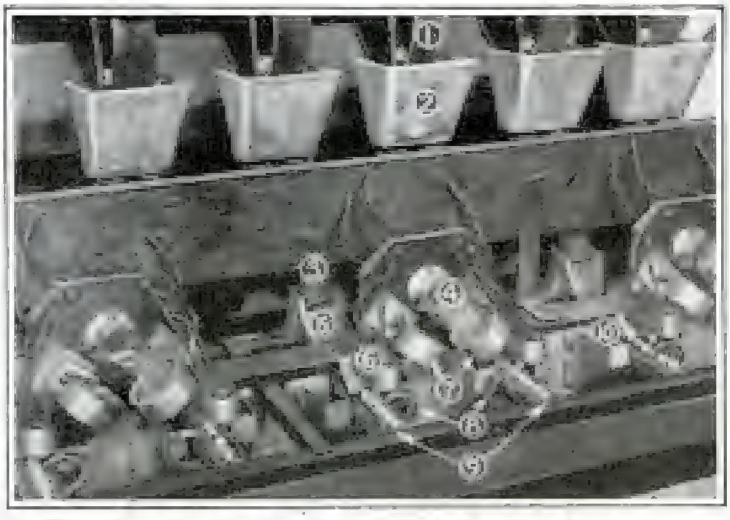
BY R. C. FOLGER

A CHAIN of 10 strands connecting the earth and the moon could be made if all the beans grown in the United States in a single year were placed end to end. Imagine having to pick out every tenth or twentieth bean from such strings! Something quite similar occurs in the sorting of beans, for the bad ones have to be picked out before marketing the product.



This Machine, Which is Easily Moved About by Two Men, Sorts 15 Bushels of Beans an Hour

Owing to the high prices they have brought in recent years, beans are no longer regarded as a cheap food. One of the reasons for this is the primitive method still used for sorting beans. Rows of women seated in front of conveyors pick out the bad beans, casting the "culls," as the bad ones are called, into a box which is weighed at the end of the day to determine the pay of the women. Unfortunately, many causes beyond the control of the grower affect the quality of a bean crop; bad weather and blights often result in a high percentage of culls in every bushel.



In This Close-Up, Number 1 Is Feed Roller; 2, a Small Hopper; 3, End of Flexible Spout; 4, Electric Light; 5, Hopper with Hinged Flap; 6, Selenium Cell; 7, Double Lenses; 8, Picker Fingers; 9, Small Rollers, and 10, Guides along Rollers

In Michigan there was a young farmer who yearly faced this situation with a questioning mind; science had aided in finding cheaper methods for industry and for other agricultural processes; why could it not help in the sorting of beans? One year he reaped an exceptionally poor crop, the culling of which consumed about half the money he would have received had the beans been good. He thereupon determined to build a machine that would sort beans at low cost at all times, and, even in the event of a low-grade crop, leave the grower a fair profit.

Without scientific training, Ray F. McWilliams, the farmer-inventor of this bean sorter, began casting about for something that would detect the difference between a good bean and a bad one, the latter being darker in color either wholly or in spots. He learned that a mineral (selenium) was sensitive to changes in light reflected upon it, resulting in a similar variation in its electrical conductivity. Obtaining a selenium cell, he made experiments to learn whether he could use it for the machine he had in mind. The cell and others he later obtained, lacked the necessary sensitiveness and was too slow in reacting to light changes. Undaunted, he proceeded, with the limited resources at his command, to unravel for himself the secrets in the construction of a selenium cell, and, thanks to an accidental discovery, the end of a year found him with a cell he could use for his purpose. The new cell could detect the slightest change in color and was quick to respond to these changes. For seven years longer he worked in the development of the machine which today picks

Mrs. Ray F. McWilliams, Ithaca, Mich.

Copyrighted material

2091

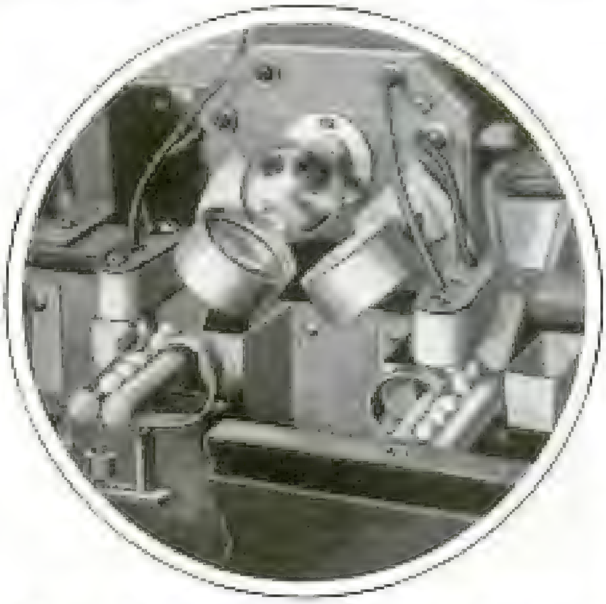
out the bad beans from among the good ones with more than human precision.

The beans are placed in a trough at the top of the machine from which they are fed by small wheels through a series of hoppers until they pass out in single file along a pair of horizontal feed rollers.

A selenium cell is placed over each pair of rollers, and is so inclosed that it receives light only through a tube, the lower end of which is directly over the moving string of beans.

As the beans pass under the tube each one receives a flood of light from an electric bulb, which is focused on it through a double lens. When a discolored bean comes into range the selenium cell reacts to the change in color, causing a magnet to close, thus raising a finger which pushes the bad bean from the rollers, while the good beans pass on into a bin and are then ready for market.

The selenium cell is electrically connected with a pair of ordinary dry-cell batteries so as to form a circuit which operates the electromagnet. Hinged to a support alongside the magnet is the finger, one end of which extends over the magnet, while the other curves around and over the rollers in such a manner that its end is opposite the lower end of the tube. When a bad bean appears, the selenium cell instantly "sees" its darker color as contrasted with that of the good, white beans. It immediately sets up a greater resistance to the electrical current passing through it. This causes the magnet to act, drawing down one end of the metal finger, so that the other end is raised. In being raised, the finger pushes the bad bean off the rollers, and it drops into a bin. The instant this is done, the change in light as seen by the selenium eye releases the magnet's hold on the finger, which returns to its first position. The good beans continue on their way down the rollers, dropping into another bin.



Close-Up of Two Units of the Bean-Sorting Machine: Note the Bad Bean Picked Out by the Unit at the Left

The machine is about 5 feet in height and length and is light enough to be easily moved by two persons of ordinary

This Illustrates the Long-Practiced Method of Sorting Beans. Each Woman Operates a Treadle That Controls the Movement of a Small Belt Carrying a Stream of Beans toward Her; the "Culls" are Picked Out by Hand and Deposited in a Box alongside the Belt

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Chicago Tribune 4/18/23 P.1

strength. Each machine is equipped with 16 cell units, which provide for a total sorting capacity of 15 bushels of beans an hour, or equal to the average work done by a dozen persons sorting by hand. The machine is driven by a ¼-horsepower motor, and the operating cost would probably be less than the wages of one man who alone could tend a number of such machines. Another advantage of the machine is that its capacity for unsorted beans would not be affected by how many bad ones were in the lot, whereas, in hand sorting, the more bad beans there are in a bushel, the longer it takes to sort them.

Grading of coffee beans as well as sorting the ordinary varieties of food beans can be done by the machine. It has also sorted olives according to the colors of green, red, and dark purple. Undoubtedly additional uses could be found for the machine in many other fields.

2167

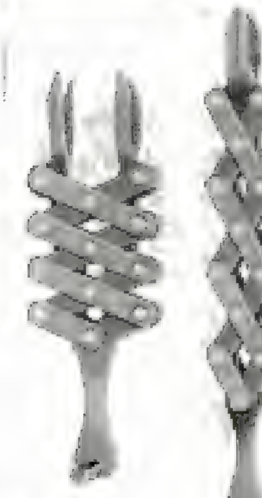
"WALL" OF WATER ROCKS OCEAN VESSEL

Towering 70 feet, a "wall" of water believed to have been set in motion by a submarine disturbance, nearly proved disastrous to the Pacific liner "Brush," 50 miles off the coast of Mexico recently. The captain of the ship described the approach of the strange freak of nature as an unbroken black line near the horizon when first observed by the lookout. When its nature was discerned, the ship was made ready for the onrush of water. When the wall hit the "Brush," the captain declared it was as if a huge hand had clasped the vessel and raised it into the air. There was not a breath of wind, but for six hours after the occurrence, the log of the ship shows, the "Brush" labored in swells equal to those off Cape Horn and was driven miles off its course.

2008

LAZY TONGS LIFT VALVE SPRINGS EASILY

The difficulty of lifting valve springs of an automobile engine to permit removal of retaining pins, is greatly lessened by means of a set of lazy tongs recently devised for the purpose. Extending the tongs closes the jaws. These latter are then inserted under the valve. Pushing the tongs shut has the effect of opening the jaws, thereby lifting the valve. A suitable handle gives a firm grip to the user.



Geo. Joseph Wainwright Brooklyn, N.Y.

2005

LEANING PINE OF ROME LEANS MORE THAN TOWER OF PISA

There is a leaning pine tree on one of the golf links near Rome, Italy, which, unlike its famous contemporary, the leaning tower of Pisa, requires a man-made support. Its curious growth has prompted much interest. To preserve its cool shade, much desired by picnickers, the municipal authorities have constructed a brick pedestal, cradled at the top to receive the curved trunk and support it.

The Unusual Direction of Growth Taken by This Pine Tree Adds a Queer Touch to the Landscape

Wide World Photos

¶Tests of samples of alluvial deposits in Pumpsaint, Wales, having shown a high percentage of free gold, it has been proposed that the deposits be worked by dredging.

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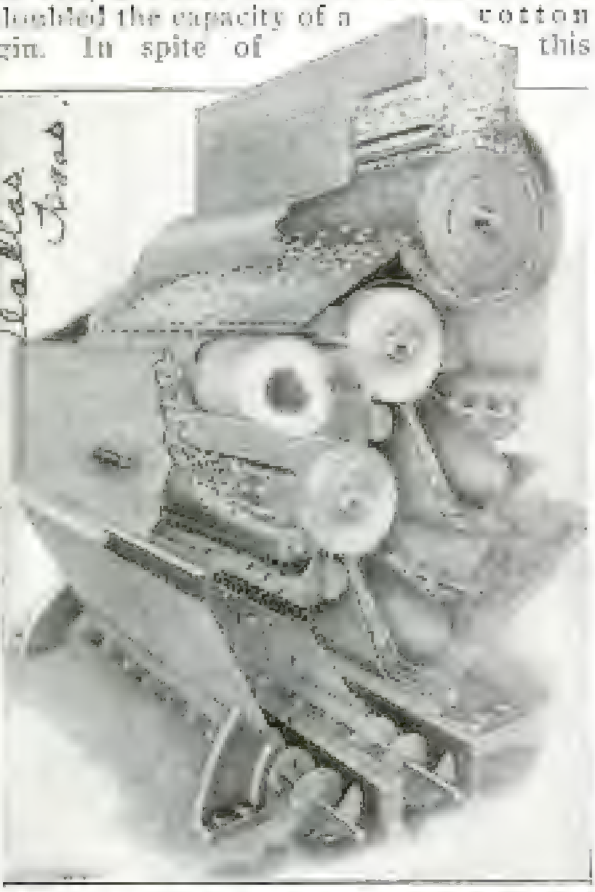
Inv. Ls. C. Stacey, Dallas Texas — Manchester Guardian 4/13/23

1983

NEW COTTON GIN USES TWO SETS OF SAWS

By using two sets of gin saws instead of one, a Texas inventor claims to have doubled the capacity of a cotton gin. In spite of this greater usefulness, only 20 per cent more power is needed to run the machine. A feature of the invention is that the upper set of saws revolves 100 or more revolutions faster a minute than the lower, thereby relieving the latter of some work and enabling the handling of the longest staple cotton. Hitherto, the long-fibered cotton has been run through rollers instead of saws.



Cotton Gin with Two Sets of Saws, Which is Claimed to Give Double Capacity

c/o Austin E. Burgess, 511 S Marlborough Dr., Dallas, Texas

2/68

BUILD FRENCH OCEAN LINER ON NEW POWER PLAN

Both as a means of saving valuable space and considerable fuel, the new French liner "De Grasse" is to be powered by a combination of electric motors and Diesel engines, the former to be driven by the latter. There are quite a number of electric ships afloat whose current is generated by means of steam turbines, but the present case is said to be the first in which so large a ship—it will be an 18,000-ton vessel—will use Diesel engines in this manner.

Space saving will be had in that it will not be necessary to build a huge tunnel from amidships to the stern to house the propeller. The generators will be placed where convenient, and the current conveyed to the motors at the ends of shafts as short as can be practically contrived. It is a well-known fact that Diesel engines are less costly in upkeep than steam turbines.

1723

GAS-BURNING NOZZLE AVOIDS FLASH-BACK

A new nozzle of simple design is reported to have overcome the difficulties of the flame being blown out, owing to the velocity of the outrush of air and gas being greater than that of the flame propagation. This condition is often encountered when an attempt is made to burn a premixed combination of gas and air. Around the main orifice of the new nozzle is an annular casing communicating with the main orifice by means of four small holes through which passes a small quantity of the gaseous mixture. With reduced velocity inside the casing, the small quantity of gas forms a circle of quietly burning flame surrounding the main orifice, which is thereby heated sufficiently to insure ignition and complete combustion of the mixture passing through it.

The Gas-Burning Nozzle, Here Seen in Action, Overcomes the Danger of Flash-Back and of the Flame being Blown Out

Mason Furnace & Engineering Co., Muncie, Ind.

L. P. Smith c/o Mason Furnace & Engineering Co. Muncie, Ind.

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1193 Ilimuba Agricultural Works
Ilimuba, Calif

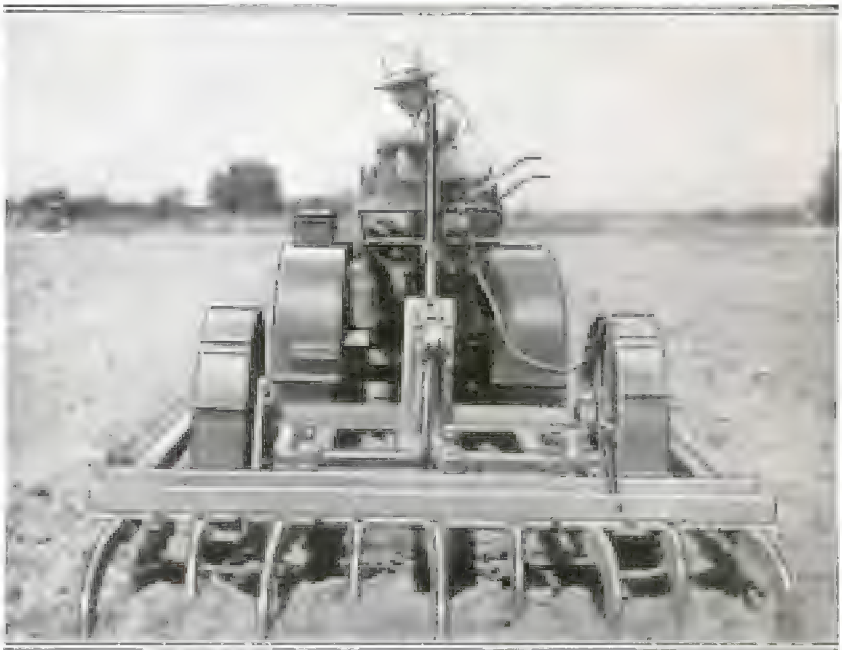
Powerful Subsoiler with Solid Billet of Annealed Steel Used for the Shank: Compare the Size of the Simple Parts of This Machine with the Girl in the Picture

SUBSOIL TILLAGE INCREASES IN CALIFORNIA

THE need of breaking up the hard soil that exists just below the soft top earth practically throughout California has led to the development of a number of powerful machines in recent years. Few farming implements have to be designed to withstand the tremendous strains that result from the resistance offered by this stubborn subsoil.

The hardpan, as this lower stratum is called, is of two kinds—natural and artificial. The former may be found at the surface or many feet below the surface, and it varies from a few inches to many feet in thickness. The artificial hardpan is the result of the farmers plowing to the same depth year after year and is appropriately called "plow sole." The danger lying in this condition is that the rain, soaking through the soft upper earth crust, drains away from the fields when it strikes the hardpan and plow sole, which it cannot soak into. Since, in California, it rains but three months out of the year, the moisture must be saved for the remaining nine months of the growing season; thus, hardpan and plow sole, which force the rain water to drain off, must be broken up.

Deep tillage consists of two operations: chiseling and subsoiling. The former goes to a depth of from 6 to 15 inches, whereas the subsoiling reaches down 24 to 48 inches. Often 225 horsepower is required to pull the tillage implement.



Heavy-Duty, Deep-Tillage Cultivator Operating at Depth of 12 Inches: The Large Teeth Tear the Hardest Soil

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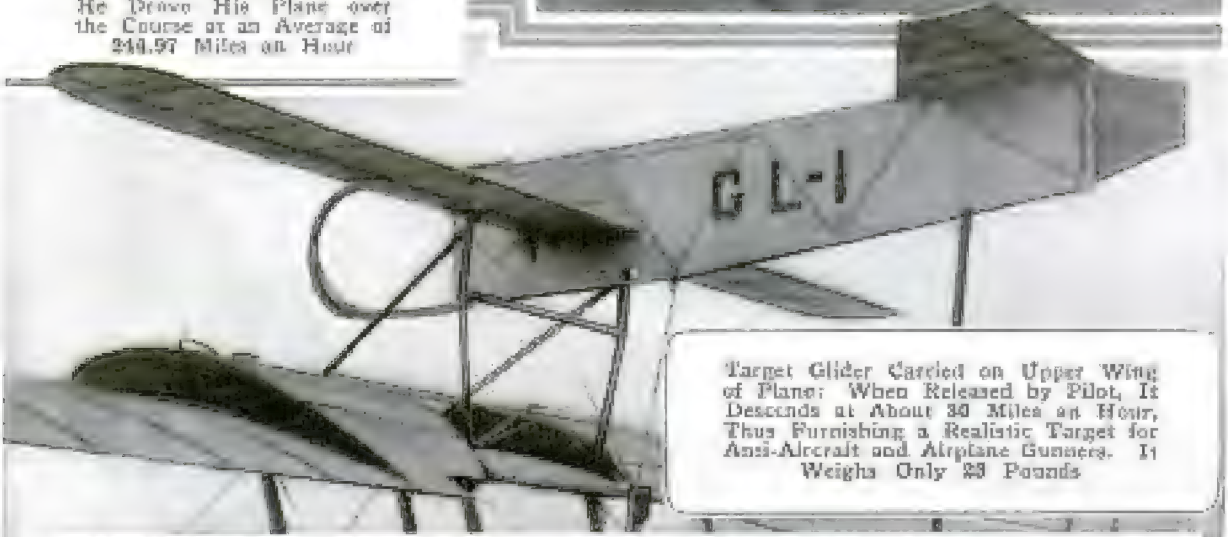
1919 Carl A. Bauer c/o Dayton Daily News Dayton, Ohio

Verne Simpkins, 2047 Rhode Island Ave. N.E. Washington D.C.

BROKEN RECORDS AND IMPROVED MACHINES

Above: Lieutenant Lester J. Maitland, Who Established a New Speed Record, When He Drove His Plane over the Course at an Average of 244.97 Miles an Hour



Target Glider Carried on Upper Wing of Plane: When Released by Pilot, It Descends at About 30 Miles an Hour, Thus Furnishing a Realistic Target for Anti-Aircraft and Airplane Gunners. It Weighs Only 23 Pounds

Gliders of This Type, Known as the "GL-2," are being Developed by the Army Air Service for the Purpose of Instructing Beginners in the Science of Plane Control, without the Expense of Purchasing and Operating Motor-Driven Planes

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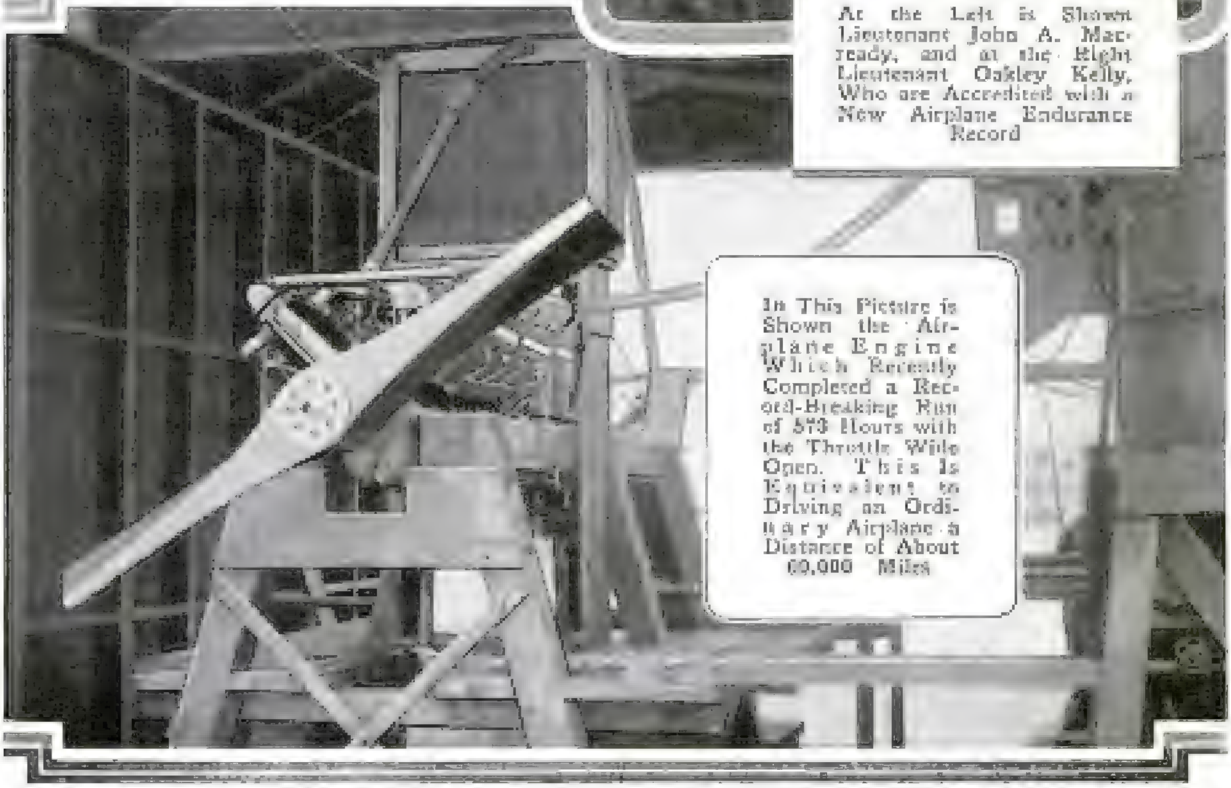
Aeronautics 1919

MARK RECENT DEVELOPMENTS IN AVIATION

In the Picture Above is Shown a View of the Fokker Monoplane "T-2," Used in Establishing the Endurance Record of 36 Hours 5 Minutes 20 Seconds, Recently Made at Dayton, Ohio, by Lieutenants Macready and Kelly. This Shatters Their Own and Other Previous Records, and at the Speed They Maintained in Cruising around the 30-Mile Course, They Traveled Far Enough to have Crossed the Atlantic. The Ship Flew at an Altitude of About 2,000 Feet and Made 75 Miles an Hour

At the Left is Shown Lieutenant John A. Macready, and at the Right Lieutenant Oakley Kelly, Who are Accredited with a New Airplane Endurance Record



In This Picture is Shown the Airplane Engine Which Recently Completed a Record-Breaking Run of 573 Hours with the Throttle Wide Open. This Is Equivalent to Driving an Ordinary Airplane a Distance of About 60,000 Miles

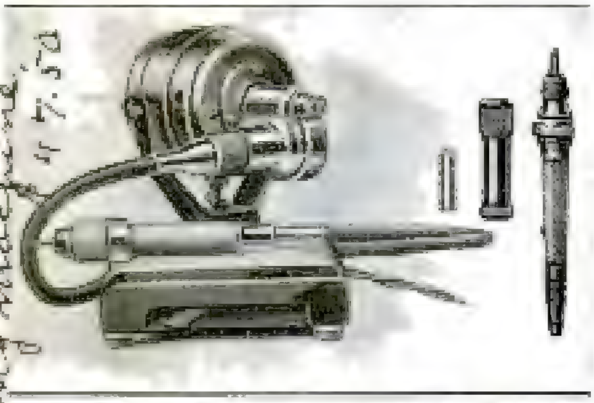
Copyrighted material

Wisconsin Electric Co. Racine, Wis

The Murdock Mfg & Supply Co 426 Plum St Cincinnati, Ohio

CONVENIENT DRILLING TOOL IS MOTOR-DRIVEN

A new utility drilling tool designed with especial reference to engraving work,



Motor-Driven Tool That Helps to Solve Hard Drilling Problems: It Is Easily Portable

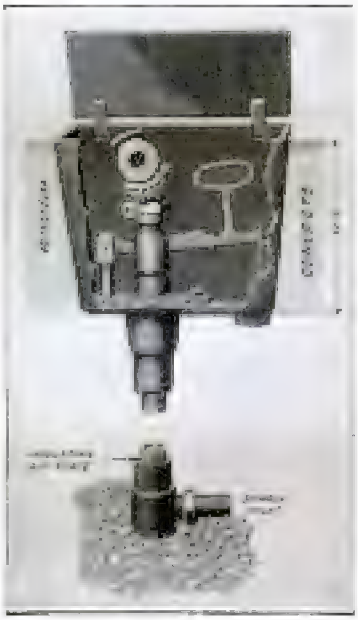
is driven through a flexible shaft geared to a universal electric motor, which is pivoted to the base. The chuck, which takes a wide range of drill sizes up to ⅛ inch, has five speeds, from 500 to 2,000 revolutions per minute.

OX-DRAWN SLEDS THRESH EGYPTIAN GRAIN

It is difficult for the American farmer, who uses agricultural machinery for practically all his operations, to realize how crude and rudimentary are the means used in other parts of the world. In Egypt, for example, a floor of beaten earth is used for threshing grain. The heads and straw are laid down lengthwise of the floor, and a crude ox-drawn timber sled is driven over the stalks. Iron disks, mounted in the heavy frame of the sled, press out the grains, at the same time crunching the straw, which is later used for fodder. Broomlike wooden forks are then used to separate the grain from the chaff by tossing the mass up into the air, the prevailing northwest wind in Egypt being an essential factor in this operation. In spite of the crudity of the method, it is claimed that good results are attained.

WATER-SERVICE BOX HAS SAFETY FEATURES

A new water-service box, intended to meet the requirements of railroad work, is designed with a view to convenience and safety-first measures. The box, which is built to be set flush with the ground or pavement, contains a lever-operated valve that must be either open or completely closed, and which is provided with a standard air-hose coupling. The device is non-freezing, is arranged for connection to surface drain, and has a self-closing cover.



Egyptian Threshers, Using Oxen to Draw the Heavy Timber Sleds over the Grain on the Earth Floor: Wooden Forks are Used for Separating the Grain from the Chaff

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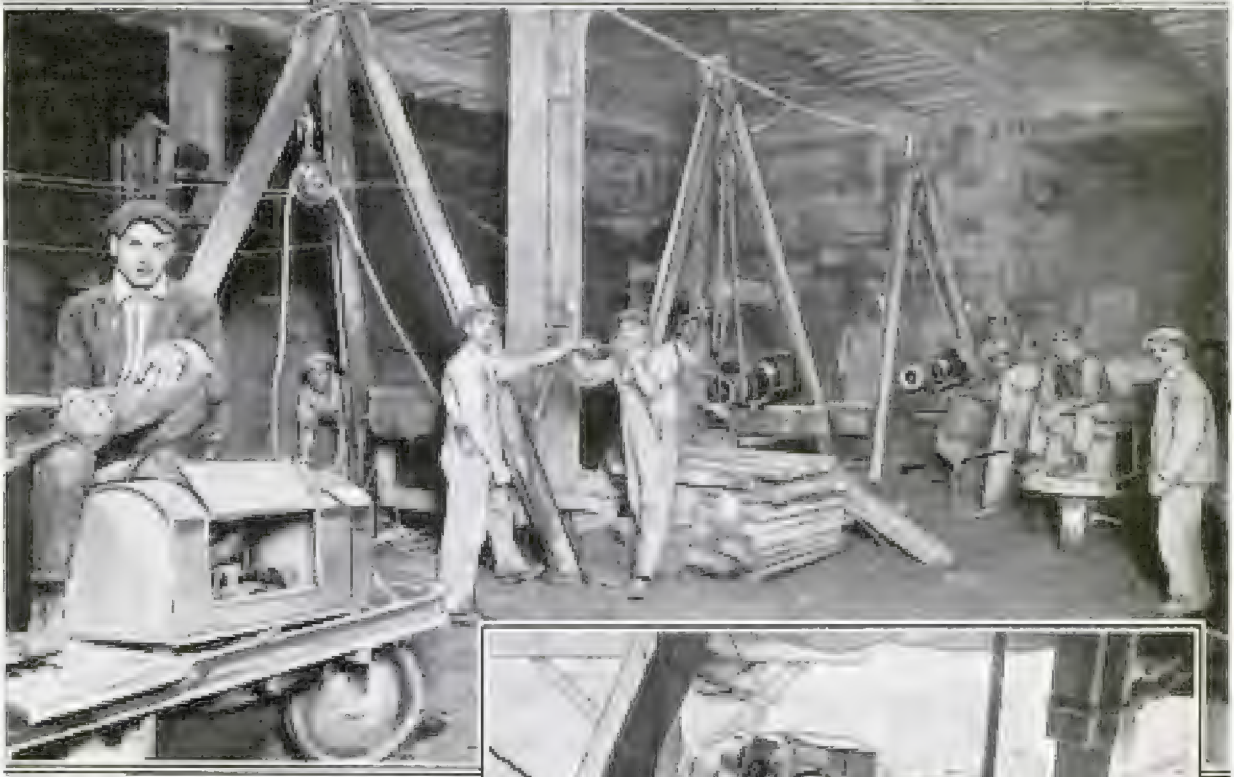

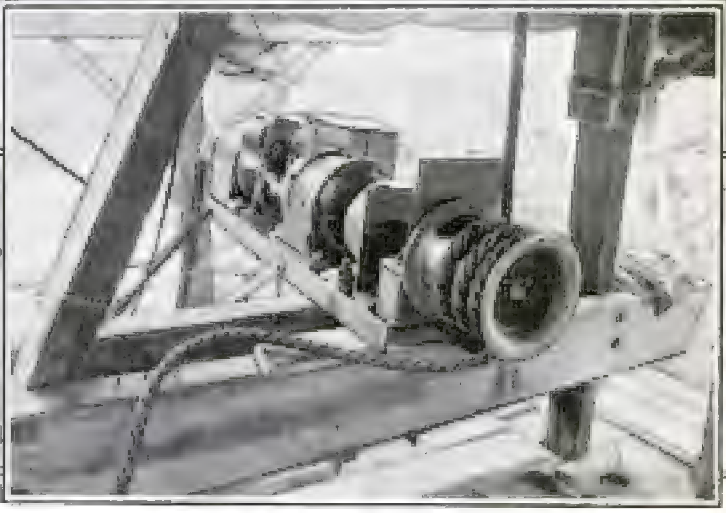

Above: A Construction View of a Large Building Operation, Showing How the Individual Caisson Hoists are Rigged Up over Each Pier or Well; They are Housed Over to Afford Shelter from Wind and Cold in Winter, and from the Heat and Rain in Summer. Deep in the Bottom of the Wells the Muckers Fill the Buckets. Right: Close-Up of the Operating Mechanism for a Single Caisson. It is Electrically Driven

CAISSON HOIST FACILITATES FOUNDATION WORK

An individual caisson hoist for each well or pier in a foundation was used with considerable success recently. This procedure has several advantages over the endless-cable system, in which 10 or more piers are worked at the same time by a single drum and engine, driving an endless cable encircling them all. In such a method the entire operation may come to a standstill if the cable fails or a sheave becomes worn. Furthermore, the set-up must remain in place until the last well is finished. On the other hand, the individual hoist can be set up anywhere, even under a building already built, without regard to the location of other hoists, and it can be shifted as soon as it has completed its particular well. It is electrically operated, and is protected against reverse motion by a positive safety device.

RED FINGER LIGHT TO AID NIGHT AUTO SIGNALING

A small red light worn on the finger like a ring, has been made to aid night signaling by motorists. As the driver extends his arm and hand to signal a turn, or whatever it may be, the lamp is automatically lighted by the outstretching of the fingers. The cord connection can be plugged into the dashboard or under the driver's seat.

Merryweather + Sons Ltd
Greenwich Road E.10 863.
2104 Long Acre W.C.2 London
England

TURNTABLE FIRE LADDER EXTENDS FROM TRUCK

An effective fire-fighting unit is seen in a new extension ladder of English manufacture which is considered remarkable for its great "reach." The ladder, which is built to reach heights of 60 to 90 feet and upward, if necessary, is mounted on a turntable carried over the rear axle of a motor truck. It can be used either for lifesaving or as a water tower. The truck motor operates the ladder mechanism by means of two levers under control of the driver, indicators showing the amount of the extension and the safe angle at which the ladder can be worked. Raising and extending the ladder can be done at one time. The four sliding sections of the ladder are raised by wire ropes, safety devices preventing overwinding and the ladders from dropping in case a rope should break. Revolving the ladder around the turntable may be done by hand or with the motor. Adjustable hinged struts at the rear of the chassis provide direct support from the ground, instead of through the wheels and springs, when the ladder is in operation. In the traveling position the ladder sections are folded lengthwise above the truck, running over the platform from the rear forward and a few feet beyond the radiator.

2149

RADIO NEWS SENT TO CHINA

A commercial telegraph company has succeeded in receiving daily messages from Hillsboro, Ore., at a radio-receiving station set up recently near Shanghai, China. Reception is over a loop antenna, transmission being through a standard arc used later in the day for working a Portland-San Francisco radio circuit. The wave length is 8,609 meters.

Federal Telegraph Co

Motor Turntable Fire Ladder When Fully Extended to a Height of 90 Feet: With the Truck Stationary, the Ladder can be Turned Around at Right Angles to the Chassis. Indicators Give the Extension and Working Angle Found Safe

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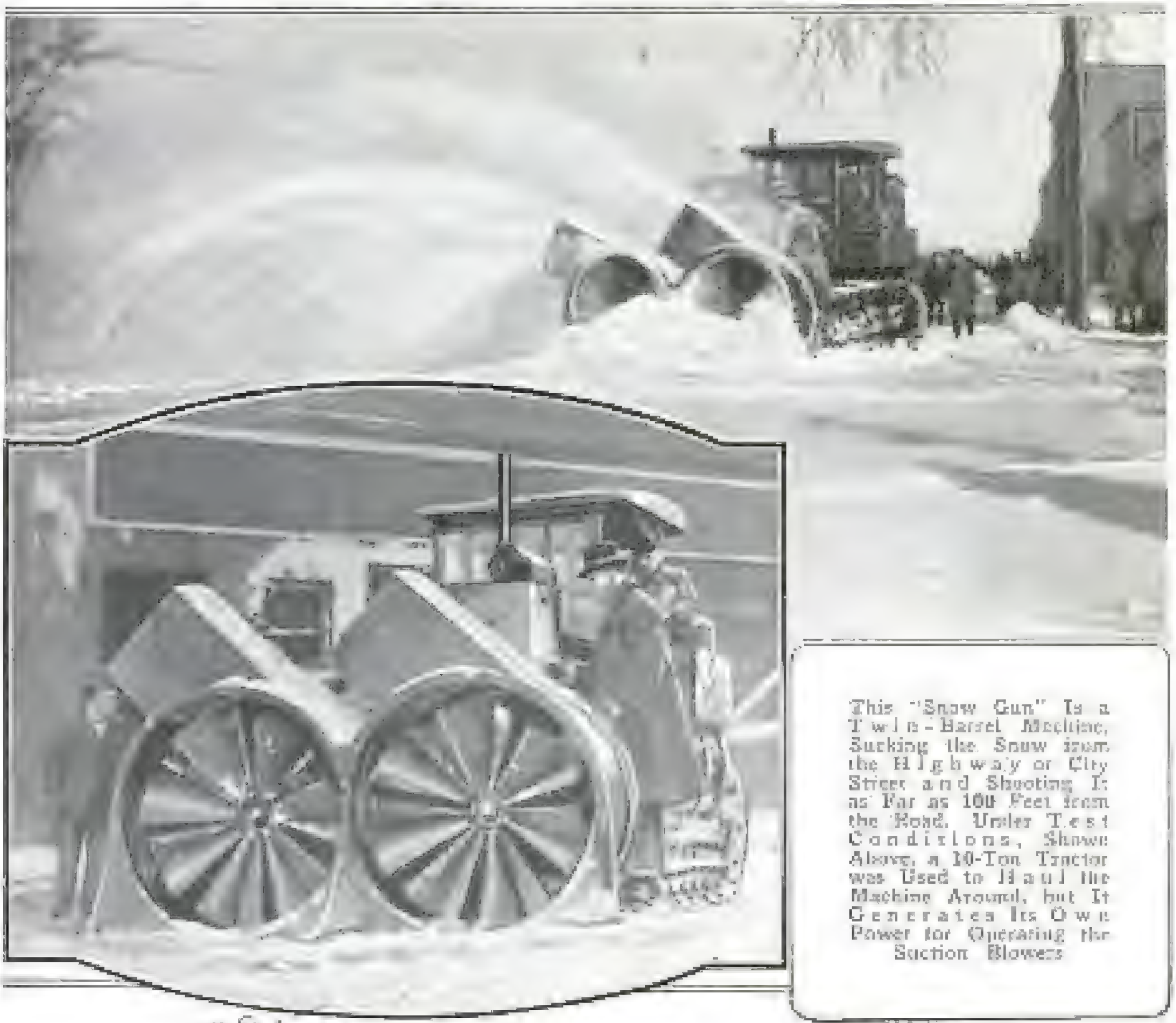
1985 C. W. Edwards Mfg. Co. Inc.
Albert Lea, Minn.



This "Snow Gun" Is a Twin-Barrel Machine, Sucking the Snow from the Highway or City Street and Shooting It as Far as 100 Feet from the Road. Under Test Conditions, Shown Above, a 10-Ton Tractor was Used to Haul the Machine Around, but It Generates Its Own Power for Operating the Suction Blowers

1985

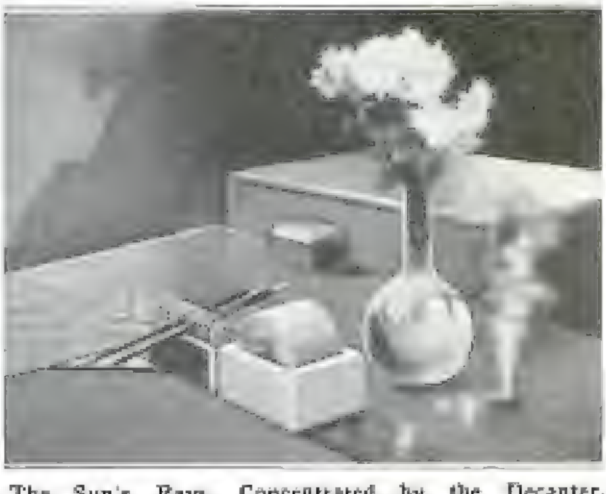
TWIN ROTARY BLOWERS SHOOT SNOW FROM HIGHWAY

A newly developed machine for clearing highways and city streets of snow was put through severe tests recently, with satisfactory results. It is a twin rotary machine, two blowers with very large nozzles being used to suck up the snow and shoot it off the roadway. An 80-horsepower gas engine is used to furnish the necessary power, but the outfit is not self-propelling, and must be hauled about by a tractor or other means. Its principal use is to "break road" quickly immediately after a heavy snowfall, and under these conditions it cuts an 8-foot swath very effectively.

2004

SUN'S RAYS AND FLASK BURN FINISH ON OFFICE DESK

How simple it is for a fire to be started was recently shown in an office at Corning, N. Y. The rays of the sun, coming through the window, fell on a decanter that was being used as a vase on the desk. It happened that the rays were concentrated on a spot about the size of a small coin, such as would have been the case had a sunglass been used. As a result, the finish at that point on the desk was burned through.



The Sun's Rays, Concentrated by the Decanter, Burned a Hole through the Finish of This Desk. Luckily, No Papers were Lying About

Att. George F. Paul, Woolworth Bldg. Chicago

2070 Chicago Yacht Club

INTERESTING STEEL-BOTTOMED DOUBLE-DECKED YACHT-CLUB FLOAT LAUNCHED IN CHICAGO

A YACHT-CLUB float, 50 feet wide and 150 feet long, with ample sail and clothes lockers, cafeteria service, a lounge, large verandas, and dinghey space, is being put in service at Chicago by the Chicago Yacht Club. On the upper deck are the cafeteria and kitchen, a storeroom, a ladies' locker room, a rest room, lounge, and promenade deck. Folding doors between the last two open for dancing.

Copyrighted material

Designed by Cox + Stevens, 2069 New York City
Artist - C. McKnight - Smith 220 Broadway New York City

LATEST ADDITION TO THE FLEET OF THE NEW YORK YACHT CLUB

THE grace and swift, birdlike motion of the sailing vessel are admirably brought out in the painting of the "Husar IV," here reproduced. The vessel is a pleasure yacht built for a New York sportsman and recently launched at Copenhagen, Denmark. For cruising purposes, it relies, besides its ample canvas, on a 600-horsepower crude-oil engine. It is 200 feet long and will be manned by a crew of 25, exclusive of officers.

COPYRIGHT, C. MCKNIGHT-SMITH, MARINE ARTIST; DESIGNED BY COX & STEVENS

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Unable to locate maker. W. A. Rofkar, Port Clinton Ohio.

MAIL-BOX SENTINEL DEFEATS LETTER THIEVES

1987

The activities of mail-box thieves, who can easily take letters from the ordinary

At the Left a Man is Seen in Vain Attempt to Pick Mail from Letter Box Equipped with Wire-Hook Appliance Recently Placed on the Market

At the Right, View Showing Wire-Hook Antitheft Appliance as It Appears on the Inside of a Letter Box: Note Letter Gripped by Lower Series of Wires

Swastika Photos 35 S. Dearborn, Chicago

box, are rendered fruitless by the attachment of a simple hook appliance recently placed on the market. This consists of two overlapping series of wires, having their upper ends coiled to impart a spring action to each series. When placed against the letter opening on the interior of the box, the upper series, like a one-way gate, permits the letter to be inserted and to fall into the box. The lower series of wires, however, has hooked ends, and guards against any attempt to withdraw the letter through the slot.

SPRAYED COTTONWOODS SHED NO COTTON

2086

The United States Bureau of Plant Industry has developed a method of preventing the growth of the blossoms of the cottonwood tree, thereby freeing that popular shade tree from one of the greatest objections to its use, the falling of the cotton. Spraying with a 2-per-cent solution of sulphuric acid is the method resorted to, and when done in the spring, is effective in stifling the growth of the annoying tufts of cotton which otherwise would strew the streets and yards. A spray of kerosene, gasoline, or common-salt solution also gives desirable results, the last having the advantage of cheapness. Crude oil, while also effective, is disfiguring to both trees and property, and, of course, the acid spray may not be used in contact with iron parts. If sprayed in the spring, before the leaves come out, no injury whatever results to the tree itself.

Science 4/10/23

NEW VARIETY OF PEACH DEVELOPED

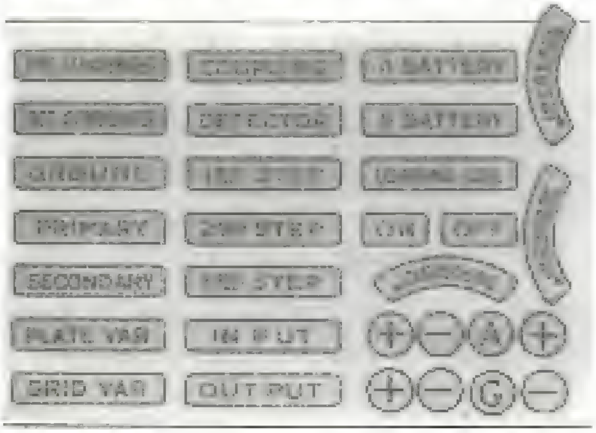
2076

The efforts of horticulturists to supply the need for a yellow peach ripening a little later than the so-called "Elberta" peach has resulted in the development of a new variety which seems to fill the desired requirements. This peach, called "Wilma," is as large and of the same color as the "Elberta," but is rounder, held to be of better quality, and ripens a week later than the latter. The trees are vigorous, productive, and hardy, and have therefore been recommended to New York State fruit growers, as well as orchard owners elsewhere, as suitable for localities where the winters are severe.

STICKER LABELS FOR AMATEUR RADIO PANELS

1945

The number of radio enthusiasts who are constructing their own sets has been growing so rapidly as to prompt one enterprising manufacturer to bring out something new for adding distinction to the completed product. This is a set of sticker labels, having a gold-dust surface, and bearing suitable identifying legends, as "aerial" or "loading coil," which can be quickly applied to their proper place on the panel. When applied, these labels have no perceptible thickness to the



These Labeled Stickers are Intended for Amateur Makers of Radio Sets

touch, and add greatly to the finished appearance, and increase the convenience of the homemade panel.

American Decalcomania Co. 229 W. Illinois, Chicago.

2060 Cmt Verne Simkins 2577
Rhode Island Ave. N.E.
Washington, D.C.

Seaplane Laying a Smoke Screen at a Height of 100 Feet above the Surface of the Water: It Is the Ability of the Seaplane to Regulate the Height of the Smoke Screen That Makes It Effective

2060

SEAPLANE LAYS EFFICIENT SMOKE SCREEN

The use of dense smoke clouds by naval vessels for the purpose of screening battleships from the enemy, has been practiced for a long time. Fast destroyers are usually employed to lay the cloud of heavy smoke, which is produced by regulating fuel and draft in the main boilers. Recent tests, however, have proved the efficacy of seaplanes in this respect. In fact, the seaplane has at least two advantages over the destroyer: It can lay a screen much more rapidly; it can regulate the height of the screen above water, and may make it completely envelop an object by flying over and around the latter. When a seaplane is used for laying the screen, the smoke results from the introduction into the exhaust pipe of chemicals that increase the volume as well as the density of the exhaust gases.

2042

MUSSEL CULTURE WILL HELP PEARL-BUTTON INDUSTRY

An important step toward insuring an adequate supply of raw material for the pearl-button industry is being made by the United States Bureau of Fisheries, which, for the first time in history, is cultivating fresh-water mussels during the entire first year of their growth. The activity of mussel culturists heretofore has been confined to getting the young bivalves well started in life, during the brief period when they attach themselves to the gills and fins of fish. Now, however, as a check upon the effectiveness of their work, the fish will be kept in large wooden troughs until the mussels drop off, after which the latter will be retained in the wooden tanks for a year, the better to observe and facilitate their growth. The mussels will then be planted in their natural environment to complete their life cycle.

Science 4/13/23

Seaplane Enveloping the Army War College Building with a Smoke Screen Laid at a Height of 50 Feet above the Ground: The Seaplane Has the Advantage of Speed over the Destroyer Previously Used for This Work

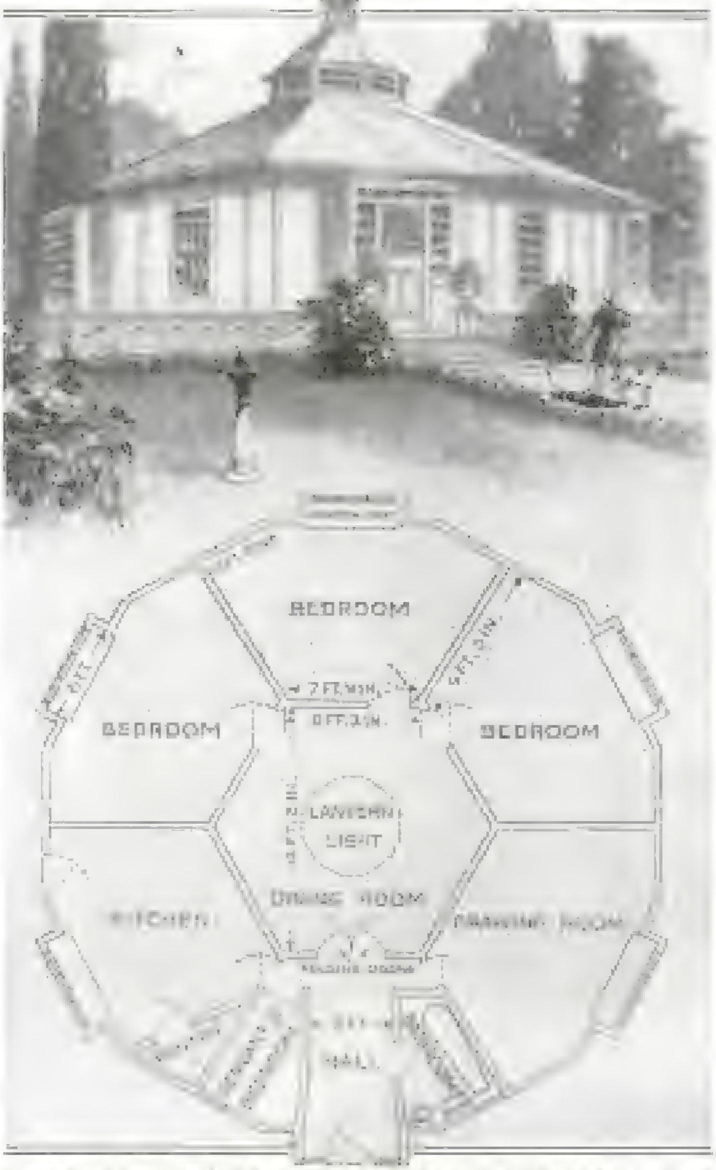
Copyrighted material

Architects - S. E. Saunders, Ltd
East Cowes. Isle of Wight
England

1995

NEW CIRCULAR BUNGALOW SAVES SPACE AND STEPS

Dissatisfied with the usual type of bungalow, a British architect has designed a circular bungalow which is cheap to construct and easy to maintain. The structure of the inner room, the largest one, forms the backbone of the whole framework, and from the corners of this, six partitions radiate, giving space for four rooms, a kitchen, a hall, a servant's bedroom, a bathroom, and a larder, in addition to the inner room. The outside wall forms a polygon of 12 sides, a dome fitted over the center room providing light and air. A form of laminated wood—three or more layers of wood cemented together under great pressure and stitched with thin cord—is used in constructing the bungalow, all sections of which are ready-cut at the factory and so designed as to enable three men to assemble them into a house in a week. The accessibility of every room should save many steps daily.



Outside View, and Floor Plan, of Bungalow Designed with a View to Economical Construction and Maintenance, and to Convenience

2074

CHANGING A RIVER'S MENACE INTO A UTILITY

The spring flood waters in many of the mountain streams of Utah carry large amounts of gravel to the cañon mouths, where the arrested speed of the current allows the gravel to be deposited over valuable land. In several cases, as at Levan, Nephi, Parowan, Beaver, and Cedar City, the townsites are so close to the cañon mouths that some of the property involved is particularly valuable.

In some instances, the gravel covers several acres, and grows deeper and larger with each spring freshet, forming fan-shaped deltas. New channels have been excavated annually in these gravel deposits, only to be filled again in the first few days of the snow-fed freshets; barriers have been constructed tending to confine the stream, and other devices and schemes have been tried, with only temporary success.

Probably the best arrangement was installed at Parowan some years ago, in the form of a riprap of large, loose logs, framed across the channel in the midst of the gravel delta. This tended to lift the stream and check the speed so that the suspended gravel was deposited in the place selected by the builders. In fact, by an ingenious arrangement of the logs, which allowed a shifting of the current when the deposit was built up to a certain height, the builders obtained deposits of sand and gravel of rather uniform sizes, which were used later in highway and building-construction work.

Also, by a system of wings it was possible to produce the deposits in suitable depths for ready loading by the dump-

Horace W. Shelley, Dept. of Forestry, c/o Utah Agricultural College, Salt Lake City, Utah

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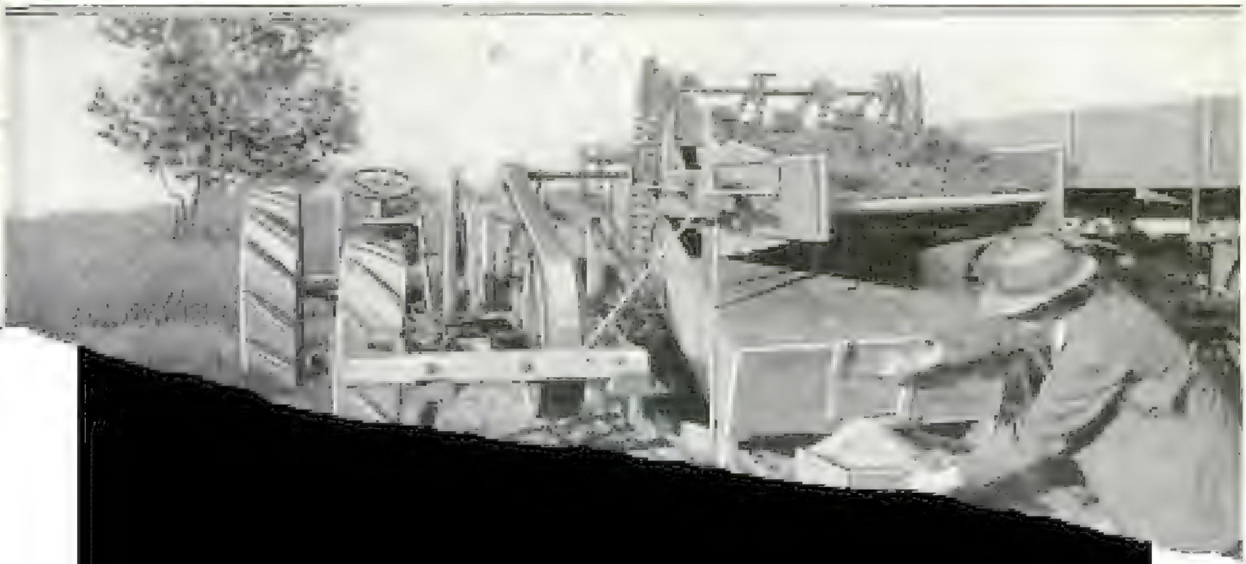
Mr. J. C. Allen, 229 Fowler Ave
Lafayette, Ind



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2061 Hawley Pulp & Paper Co., Oregon City, Ore.

MILLS RUN WHILE POWER DAM IS REPAIRED

BY HORACE E. THOMAS 711 Dunckley Ave Portland, Ore

WHEN the swollen waters of the Willamette River late last winter tore a great jagged hole in the dam that impounds it to supply power for the manufacturing plants at Oregon City, a serious engineering problem arose. This was to restore the dam and to keep the wheels of industry running in the meantime. The problem was solved by an engineering feat of exceptional difficulty.

The dam controls a large body of water that is diverted from the Willamette above the Oregon City falls, which, though [redacted] beauty

[redacted]

gap and to string a $2\frac{1}{2}$-inch cable between them. Hanger rods were attached to the cable and from the rods was suspended a large beam constructed of four timbers, each 8 by 16 inches, securely bolted together. As soon as this was in place, it was strengthened by a framework of large timbers heavily braced.

The upper surface of the dam [redacted] slope of 45°, and the next [redacted] slide into place, one by [redacted] that were to [redacted]

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Lafayette, Ind

Above: Rear View of Combined Soy-Bean Harvester and Thresher, Showing Removal of Beans after Trip across Field. Left: Machine Operating in Field; Note That Machine is Offset from Tractor Which Travels over Harvested Ground

pit method, after the floods had subsided. A gravel-arresting dam at Kanosh, on Corn Creek, will have an initial capacity of about 50,000 cubic feet of gravel, but can be made to carry twice that amount by adding a few feet to the height of the barrier.

1925

BEAN HARVESTER THRESHES IN SAME OPERATION

A new machine for threshing beans as they are harvested has been built by a soy-bean grower who found separate harvesting and threshing too expensive. At the front of the machine are two slots, each for a row of beans, with guides that deflect the bean plants into the path of the slots, where the beans are threshed out by vertical beaters that strike both sides of the plant. The beans that fall from the pods are elevated by drag chains to the top of the machine, where shaker screens separate them from dirt and other foreign materials, these being discharged at the rear of the machine. The beans drop through the screens into boxes that are large enough to hold the accumulation from one complete trip across a 1,600-foot stretch. The machine is tractor-drawn, and it is stated that it will harvest approximately an acre of beans in one hour.

2014

GASOLINE BLOWTORCH HAS FOOL-PROOF FEATURES

Unusual features to promote safety have been embodied in a new blowtorch now on the market. It uses gasoline or kerosene as fuel. One of its favorable points is a safety valve that blows off at 40 pounds' pressure, which is about twice the normal. Another advantage is that there is only one opening in the tank, above the fuel line, which eliminates troublesome soldered connections.

Mr. Homer Johnston Sheridan Ind.

Am. Walter Sturtevant Westfield, Ind.

The Turner Brass Works Sycamore, Ill.

Hawley Pulp + Paper Co,
Oregon City, Ore.

2061

MILLS RUN WHILE POWER DAM IS REPAIRED

BY HORACE E. THOMAS, 911 Dunckley Av
Portland, Ore

WHEN the swollen waters of the Willamette River late last winter tore a great jagged hole in the dam that impounds it to supply power for the manufacturing plants at Oregon City, a serious engineering problem arose. This was to restore the dam and to keep the wheels of industry running in the meantime. The problem was solved by an engineering feat of exceptional difficulty.

The dam controls a large body of water that is diverted from the Willamette above the Oregon City falls, a cataract which, though not high, is famed for its beauty, and is familiar to travelers in the West. The flood resulted from heavy rains and warm temperatures that melted the mountain snow at the source of the Willamette and its tributaries. The swift water, growing to almost unprecedented volume, practically leveled the falls, inundated the surrounding country, and exerted a tremendous pressure which the timber dam, 800 feet long and 17 feet high, could not withstand.

At the height of the flood came a crash of tearing timbers that could be heard above the roar of the water. A section of dam, 100 feet long, was swept away and the pent-up water found a new outlet through which it rushed.

As soon as the waters had receded sufficiently to permit operations, engineers surveyed the situation. The usual method would have been to construct a cofferdam and then make the repairs in comparative safety. This method was rejected, however, because it would have meant closing down many factories, entailing great loss to the paper and woolen mills affected. However, since the river was certain to remain at a stage of comparatively high water for several months, and since, even with the gap in the dam, there was sufficient power to keep the mills running, it was determined to restore the dam without the protection of a cofferdam.

Several methods were suggested. It was first decided to build a great slab of reinforced timbers and beams and to slide it into place, as a section of the dam, 20 feet at a time. This was abandoned as impractical, uncertain, and costly, and it was determined that it would be more feasible, although hardly less hazardous or difficult, to bridge the opening one timber at a time.

The first step was to build towers of piling, 20 feet high, at each side of the gap and to string a 2½-inch cable between them. Hanger rods were attached to the cable and from the rods was suspended a large beam constructed of four timbers, each 8 by 16 inches, securely bolted together. As soon as this was in place, it was strengthened by a framework of large timbers heavily braced.

The upper surface of the dam has a slope of 45°, and the next step was to slide into place, one by one, the timbers that were to form the component units of the dam. Each of these timbers was 14 inches square and 26 feet long. It was no simple job to place these timbers, but once in position, they were held securely by the pressure of the water and the reinforcing that connected them with the part of the dam already in place. The great beam on which they rested could not have borne the terrific weight if it were not for anchor cables attached to the beam at right angles and fastened on shore. Several of these cables were attached as soon as the beam was laid, and others added, every 70 inches, as the deck of the dam was built. Turnbuckles were provided, so that the cables might be tightened as required to keep the structure in alinement.

The difficulty of the work was increased by the fact that the lower ends of the timbers rested on solid rock. It would have been much easier to get them into position if the ends could have been buried in mud or sand. Once they were in place, the usual method of holding them with sacked sand was followed.

Hazardous as the work was, it proceeded without mishap. With the season of low water approaching, contractors rushed the dam to completion, so that by the time the river fell, the dam would be ready and the mills kept running.

ELECTRIC TREATMENT RAISES VISCOSITY OF OILS

2061

That the viscosity of mineral oils can be raised by a combined treatment with electric discharges and with hydrogen, is the contention resulting from a series of systematic experiments recently completed. The treatment increases the viscosity of the oil and makes it more resistant to high temperatures, thereby rendering it suitable for use in place of more expensive lubricants, such as castor oil, in machines like air compressors, Diesel engines, and internal-combustion motors, it is claimed.

La Nature 3/24/23

2061

Above: Looking alongside the Dam, from One End of the Temporary Framework, Erected to Assist in Stopping the Gap in the Dam. The Rushing Waters Made the Repair Operation a Hazardous One. Below is Shown the Opposite Face of the Dam, at the Crest. Heavy Cables Anchored the Framework to the Shore

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GLOVE PROTECTS THROWING HAND OF CATCHERS

A baseball glove to protect the throwing hand of catchers is being introduced

Above: A Close-Up of the New Glove. Right: As It would Appear When Worn by a Catcher in Batting Practice

by a sporting-goods company. The base of the glove is similar to a first baseman's mitten, with the exception that the fingers are joined together at the tips and heavily padded. The glove is designed for use in batting practice—particularly to protect the fingers from foul tips and wild pitches. In a game, it would, of course, have to be discarded, since it would interfere with throwing the ball.

POCKET MICROSCOPE FOR FIELD WORK

A handy, compact microscope has been patented recently and placed on the market, designed especially for the use of those who frequently wish to make ex-

Left: A View of the Microscope Made to be Carried on Field Work. Above: Notice the Small Size of the Instrument

aminations while away from the laboratory, and for students. The instrument has a range of magnification from 25 to 225 times, is equipped with a hairline focusing device, removable stage, slide clamps, and reflecting mirror. The magnification is obtained without interchanging lenses by simply withdrawing or telescoping its tubes, which are conveniently marked for this purpose, to the desired degree. A dust-proof protective cap is provided, and the instrument is small enough to be carried in the pocket.

PORTABLE PEELING MACHINE FOR SMALL RESTAURANTS

A peeling machine which is small, light, and can be put out of the way when not in use, has been made for smaller restaurants. The device, consisting of a circu-

Portable Peeling Machine in Operation: It is Conveniently Rested on the Sliding Board of a Kitchen Sink

lar metal drum with an intake chute, a discharge door, a hose connection, a water-discharge opening, and an electric motor, is placed on the sliding board of the kitchen sink. Peeling is accomplished by an arrangement of revolving, perforated cylinders, while a continuous stream of water washes out the fine peel and dirt. It is claimed the device will peel 15 pounds of potatoes, turnips, or other similar vegetable in less than two minutes.

¶Rubber bands are placed about the Sunday home-subscription issues of an Indiana city newspaper. It is claimed that the innovation prevents the various sections of the papers from being blown about, and lost, while on the porch or doorstep.

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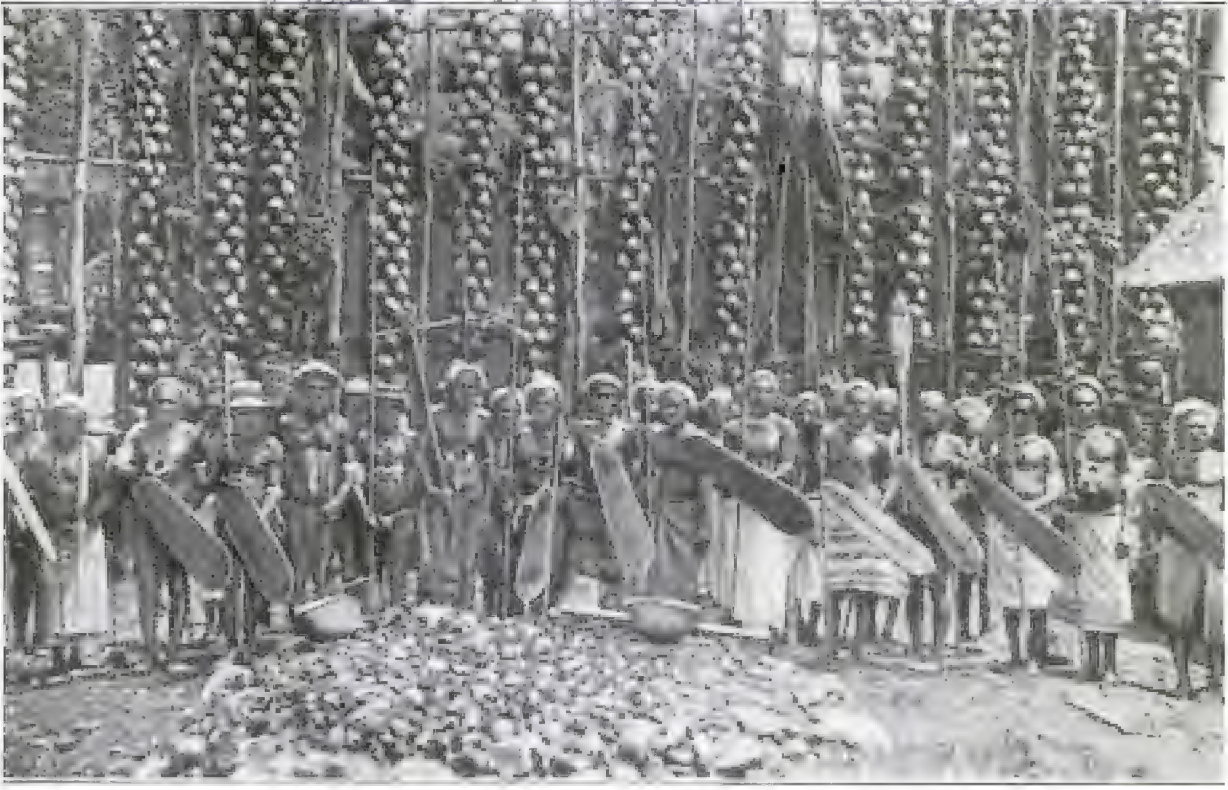
1998 Thos. P. McMahon, c/o D. Vabsley, Esq. Bank of Australia, Martin Place Sydney Australia



COCONUT FESTIVAL STAGED IN SOLOMON ISLANDS

NATIVES of the Solomon Islands, who, because of their cannibalism, head-hunting, and other cruel habits, have long had an unenviable reputation among civilized nations, are gradually becoming less savage. Under strong British, German, and Dutch influence, they are largely confining themselves to more humane practices and ceremonies. One of the more popular of these is the festival of the coconut. Thousands of the nuts are strung along poles, and the tribesmen circle about them in a weird, frenzied dance to the music of tom-toms. Afterward, the coconuts are eaten at a great feast. The interesting photograph given here, showing a group of the warriors decked out in their holiday regalia, was snapped just before the festival began. Behind the tribesmen can be seen a section of the coconut poles around which they dance.

1934

OLD NEW HAMPSHIRE MANSION TO BE MOVED TO NEW YORK

An undertaking of no little difficulty faces the Metropolitan Museum of New York in the transporting of a New Hampshire mansion to Gotham. Searching for a suitable home for its colonial treasures, the museum finally purchased the Wentworth Gardner house, at Portsmouth, N. H., built in 1760. Containing as it does some of the finest examples of colonial art, particularly carved woodwork, the museum authorities believe it can be placed as a wing to the present museum building. The old furniture has already been sent to New York, and soon the mansion will be moved, probably by dismantling it and shipping it in pieces. It will be incorporated as part of the museum, and its treasures will be on view to metropolitan visitors.

The Wentworth Gardner House, Now at Portsmouth, New Hampshire, Where It was Built in 1760; It is About to be Moved to New York City

Aut. Walter D. Jordan, Weymouth Mass.

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CHILD'S PUSHCART CARRIED LIKE BRIEF CASE

A new pushcart used for wheeling children along the street, that folds up and can be carried like a brief case, is being

Left: Wheeling a Child in the New Folding Pushcart; Above: Pushcart Completely Folded for Carrying Like a Brief Case, and Half Folded, Showing How Wheels Disappear from View When the Cart is Completely Closed

placed on the market in England. It is designed for people traveling with children, and can be taken into busses or railway coaches like ordinary hand luggage. It is made mostly of aluminum, and as it weighs only 14 pounds, may be easily carried.

NOVEL FARMING EXPERIMENT FOR WAR VETERANS

Sixty world-war veterans are trying an interesting experiment in California's famous Imperial Valley. This group of men, injured during the war and now being assisted by the U. S. government, have taken peaceful possession of the land near Brawley, formerly known as McDevitt's Project. McDevitt was the leader of a group of idealists who established a colony, hoping for a perfect or Utopian community life.

When the colony failed, the Veterans' Bureau, aided by the businessmen of Brawley, decided to take over the land for its charges.

Under the plan worked out between the bankers of Brawley and the Veterans' Bureau, each ex-warrior picks out his farm and contracts to pay for it in from 14 to 28 years. The cost naturally varies according to the character of the land and the improvements made. During the first three years the veteran is required to pay only 3 per cent interest on the cost. After the third year he must pay one-fiftieth of the cost every six months. On these 50 installments he pays 5 per cent the first two years and 7 per cent for the remainder of the period.

As the buyers, in most instances, are starting the experiment with very little capital, the owners of the land are furnishing vines and fruit trees and making necessary improvements, the cost to be paid by the veteran when the vines and orchards begin to bear.

Another new idea adopted, was that a budget of expenses be made out by months for three years ahead and closely followed by the purchaser. The benefits derived from the budget plan, however, have been quite remarkable, and it now has the hearty support of all the veterans.

In addition to this economic training, the settlers are also receiving the very best scientific training and advice. Naturally a large colony of this kind attracts attention. Experts connected with both government and private institutions and organizations are visiting the veterans and giving them the benefit of their experience in poultry and hog raising, dairying, the raising of fruits and vegetables, farm management, irrigation, machinery, in fact in every branch of farming.

¶When the floor of a concrete reservoir started to crack before it was put into service, the idea was conceived of accelerating the cracking so that its worst effects might be known and remedied. Ice and salt were spread over the floor for a depth of 6 inches, then drained away, the cracks opened with chisels, and then filled with a mastic composition.

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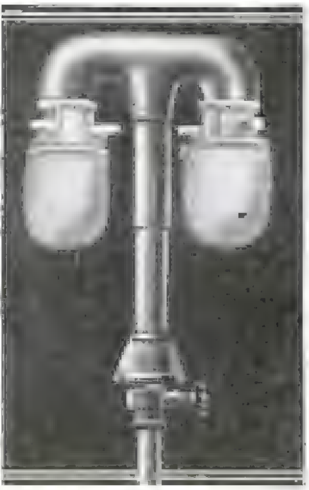
A String of the 3,000 Camels to be Used in Carrying Railway Ties and Other Supplies for the New Railroad to be Built in Australia from Oodnadatta, in the South, to Port Darwin, in the North

DOUBLE GAS-MANTLE BURNERS GIVE IMPROVED LIGHT

Greater lighting efficiency is claimed for a new type of incandescent-mantle light, recently invented, which has twin burners. The gas inlet passes between the burners, permitting the gas to become heated by radiation from the glowing mantles. This system is credited with a considerable increase in light, with only a relatively small increase in gas consumption. The argument is that the heated gas, reaching the mantles at or near the ignition point, can have no cooling effect on the mantles.



NEW AUSTRALIAN RAILWAY TAPS RICH LANDS

The Australian commonwealth government announces that the new transcontinental railway, from Oodnadatta, in the south, to Port Darwin, in the north, will be built through the richest mineral and finest pastoral sections of the center of the continent. This will be the first step of a plan to cover every section, including the vast deserts, with railways which will not only facilitate commerce but also form a defensive barrier for the Australian coastline. It is estimated that, as in the case of the east-to-west transcontinental railway, which was opened for traffic a few years ago, over 3,000 camels will be employed in the preliminary construction work.

PORTABLE RECEIVING SET IS EASILY INSTALLED

A portable, extremely light radio-receiving set which can be put into operation by simply allowing some flexible insulated wire to lie on the floor and attaching another wire to a telephone or radiator, is being offered the public. The crystal, of the fixed type, is within a holder resembling a telephone pedestal, while the earpiece is set at the top. The usual means of tuning in are provided. The radius is from one to about 35 miles. Extra earphones may be attached by a special extension arrangement.

The Portable Radio-Receiving Set in Use: Above, a Similar Set for Use with a Permanent Aerial

2054

BRITISH ROADBUILDING EXPEDITION

Settling of a Fixed Frontier Policy has Always Been One of the Most Delicate of the Problems Facing the British Government of India. Recently a Roadbuilding Expedition Began Operations from Thal to the Tochi River in the Rasmak Plateau. Rasmak Is the Objective of Getting into the Heart of Waziristan, Which has Always Been a Veritable "No Man's Land" between the British Northwest Frontier of India and Afghanistan. Consequently a Comprehensive System of Defense, by Soldiery, of the Road Workers has Been Necessary to Protect Them against the Constant Sniping of the Savage People, the Mahsud Tribes, Who Inhabit This Wild Stretch of Territory and Resent the Encroachment of Civilization. Above: The 56th Rifles Advancing as a Reserve Unit over a Section of the Completed Military Road to Rasmak. Left: Sappers and Miners Working on the Road, Camel Trains Supplying Water and Crushed Stone

International Newsreel Corporation New York City

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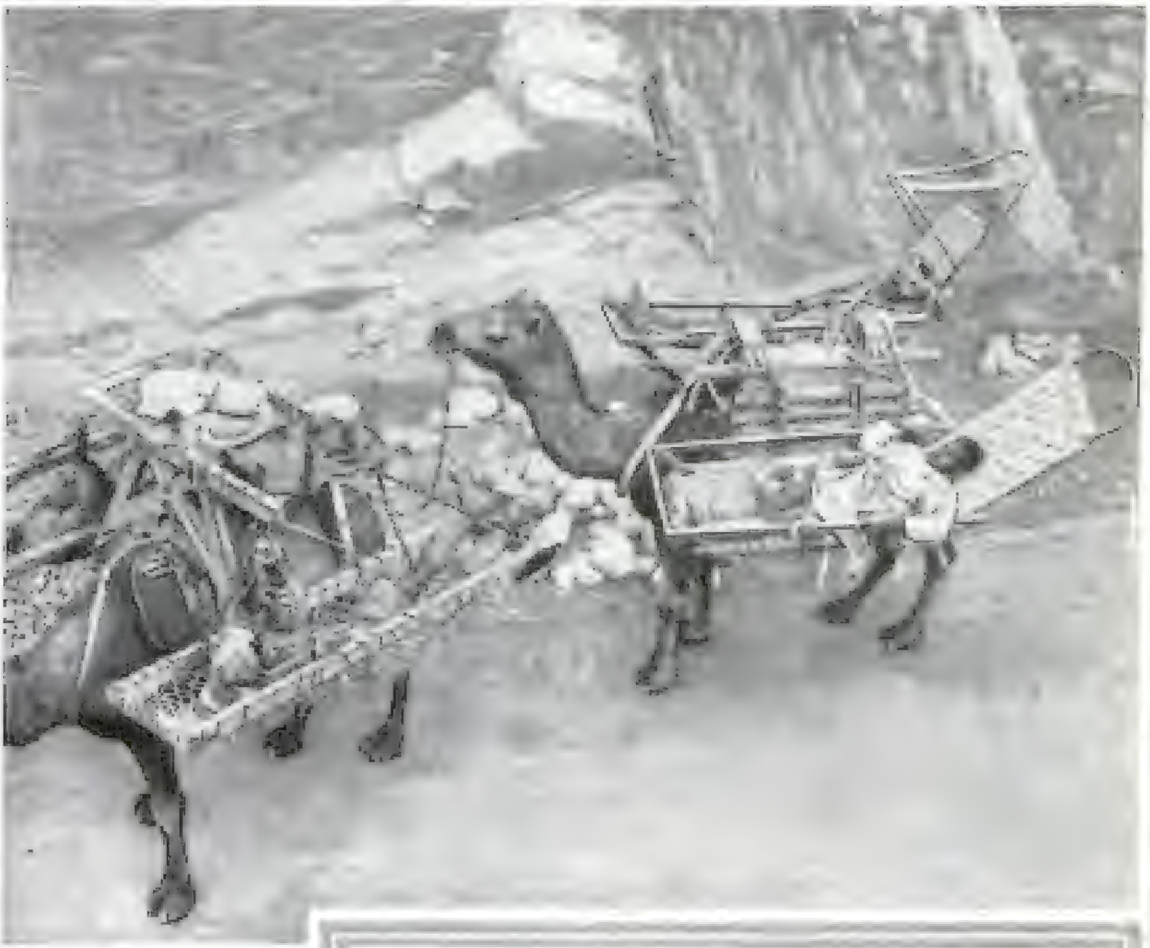
PENETRATES INDIA'S LAST FRONTIER



Above: In Spite of the Vigilance of the Military Corps, the Mahsud Outlaw Bands Continually Took Toll of the Workers. As a Means of Transporting Troops and Laborers Wounded in These Frequent Encounters, Captain C. M. Stoker, M. C., in Charge of the Work, Devised a Special Type of Stretcher for Attachment to the Camel Pack. The "Doli," as the Device is Named, is Here Seen. It is Made in Two Types, and a Pair is Swung from a Support on the Camel's Back. Right: A Large Steam Roller Brought from Delhi, Many Miles to the South, being Employed to Make a Road around a Bad Corner. The Presence of This Machine of Modern Life, Together with the Work It is Aiding in Performing, Symbolizes to the Wild Tribesmen the Advance of a Civilization They in No-wise Court. They Believe That When the White Man has Once Penetrated Their Mountain Fastnesses, Their Liberty will have Gone

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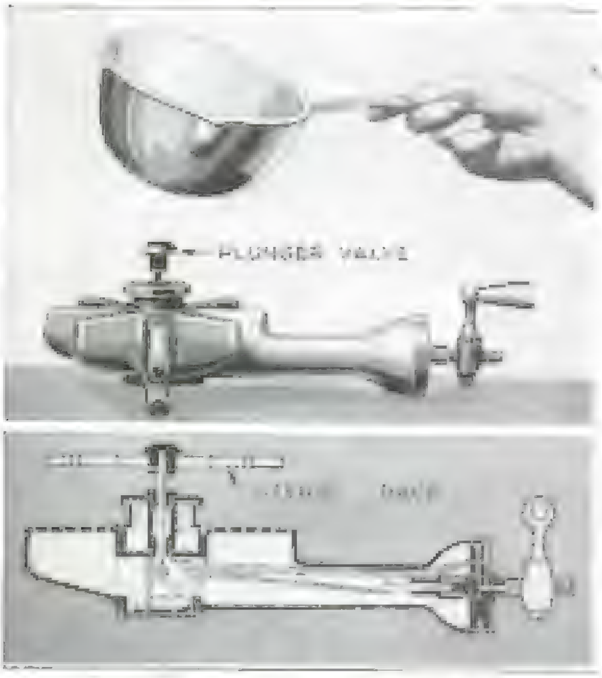
KITCHEN GAS-RANGE BURNERS LIGHT AUTOMATICALLY

In the usual "self-lighting" gas burners on kitchen ranges it is necessary to turn on the gas and press a button to cause the pilot flame to operate. A new burner, recently invented, does away with this feature, by lighting automatically when a vessel is placed on a rack above the burner. The weight of the vessel operates a plunger which opens the main valve and admits gas to the burner, where it is ignited by a small pilot light. Removal of the vessel from the burner automatically cuts off the gas supply. The burner is made to fit any stove, and can be substituted for the ordinary burners.



Above: Plunger Valve in Elevated Position, and Gas Supply Off. Below: Sectional View, Showing Interior of Burner

TAR-POURING KETTLE HAS ADJUSTABLE NOZZLES

An improved type of pouring kettle just placed on the market has the decided advantage of using adjustable nozzles for pouring tar, thereby minimizing drippings and leaks from the spout. Three sections, each screwing into the other, make up the spout, and any of these may be removed, according to the flow desired. The outlet valve is controlled from the handle, making it easy to fill any joint in the roadway with minimum drip, and the valve itself is so close to the nozzle that it aids in this effect.

JAPAN QUIETLY MAKING ADVANCES IN AVIATION

THE picture shows Akita, one of the Japanese flying aces, and the plane, of native manufacture, in which he has made some noteworthy flights. Japan is regarded as the most advanced in air craft of any of the nations of the Orient, although Siam and China are also showing progress. Not only is aviation being developed by the Japanese for military purposes, but also for commercial work and for sport.

Copyrighted material

1818 William Thompson, Banco Lisboa & Açores Lisbon Portugal

NOVEL PORTRAITS MADE BY MULTIPLE EXPOSURE

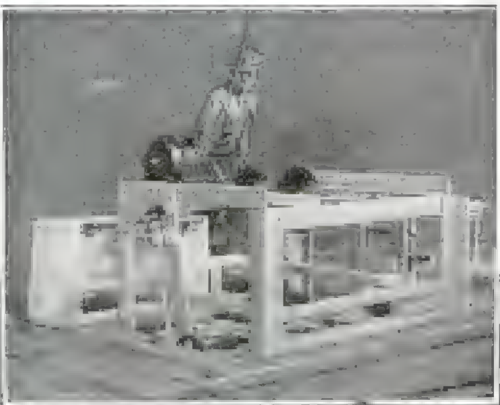
SOME interesting portraits have resulted from a method of multiple exposure which differs from the ordinary process in that there is an overlapping of the various views with no division line between them. It is likely the pictures were made against a dull dark background and in a room where the only illumination was from one or two lamps placed at the sides of the camera in such a way that light would be reflected only from the sitter. Then, by making a time exposure near one edge of the film, the other portions would be unaffected and different portions could be successively exposed by turning the camera slightly before each exposure.

No further information available

1012

MACHINE CUTS ICE CAKES TO STANDARD WEIGHT

To cut blocks of artificial ice into cakes of standard size and weight at the factory, an inventor has developed a machine for scoring the large blocks as they come from the refrigerating machines. After the 300-pound blocks come out of the machines they are run through the scoring machine. Rapidly moving saws cut the blocks to size in two directions. Then a tap from the point of the iceman's tongs will divide the blocks, thus saving much time and unnecessary waste. A block so divided, will, of course, also greatly facilitate delivery.



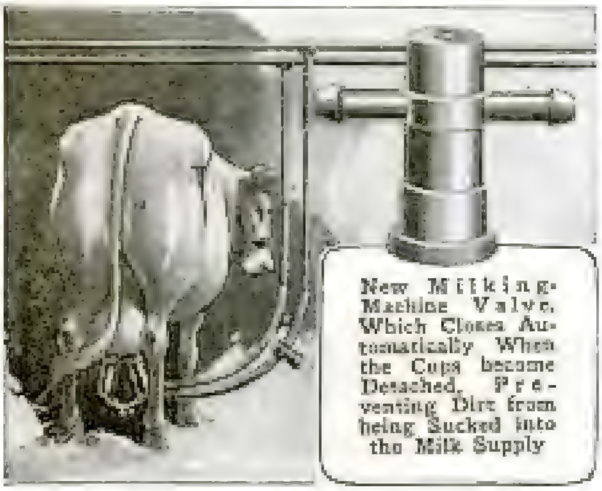
Above: Ice-Scoring Machine as It Appears Ready for Work. Below: Left, Machine in Operation, the Saws Cutting Marks to Indicate Weights; Right, Blocks Chopped after Leaving Machine, Showing Clean-Cut Surfaces

The Rayzor Ice Scoring Machine Co. Denton Texas.

Copyrighted material

NEW MILKING-MACHINE VALVE PREVENTS INFECTION

A new type of vacuum valve has been devised which automatically and instantly closes whenever the operation of the hose line to which it is attached is interrupted. The valve is especially adapted for use with milking machines. When the cup is accidentally detached from the cow's udder and falls to the floor, as frequently happens, instantaneous closing of the valve prevents dirt and other impurities from being sucked through the hose into the milk supply, thereby contaminating an entire tank of the fluid. The valve opens automatically as soon as the cup has again been attached to the udder.



New Milking-Machine Valve, Which Closes Automatically When the Cups become Detached, Preventing Dirt from being Sucked into the Milk Supply

ONION-"SET" PLANTER SAVES TEDIOUS LABOR

The drudgery of planting onion "sets" by hand is greatly lightened, if not entirely eliminated, by the use of a mechanical planter recently placed on the market. This device is conveniently mounted on a light four-wheeled frame, having two inclined wheelbarrow handles for propelling by hand. A hopper with inclined bottom guides the young onion set into a funnel spout, dropping it directly into the bed of a short furrow which has been previously loosened up by a small specially shaped shoe just in advance of the spout outlet. The planter also has several adjustments for sets of differing size.

This Is the Mechanical Onion-"Set" Planter, Which Is Capable of Planting from 15 to 25 Bushels of Sets per Day, in Rows 12 Inches Apart

AUTO-WASHING DEVICE KEEPS SOAP SOLUTION UNIFORM

Garage workers realize the importance of using a proper soap solution for washing cars, knowing that an excess of soap, aside from being wasteful, will damage the car. A recent invention does away with this difficulty by providing mechanical means for properly dissolving the soap. It consists of a mixing tank, having inlet and outlet valves, and a perforated soap-holding receptacle which can be agitated and revolved from the outside of the tank after water has been admitted. The piping is so arranged that live steam may be by-passed around the soap receptacle and through the outlets in case soap has accumulated in the valves or clogged the perforations.

Either Hot or Cold Water, or Live Steam may be Used with This Soap-Mixing Device Designed for Use in Cleaning Automobiles

¶Considering the title of chauffeur objectionable, a New York organization of hired drivers of private automobiles which recently opened a $400,000 clubhouse, has named the club the Society of Professional Automobile Engineers.

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1915 U. S. Dept. of Agriculture Washington, D. C.

View of a Room in the Department of Agriculture's New Moving-Picture Laboratory, Showing the Arrangement of the Lights and Camera: Note the Open Construction of the Room, Providing an Abundance of Light from Both the Skylights and the Windows

FEDERAL FILM LABORATORY COMPLETELY EQUIPPED

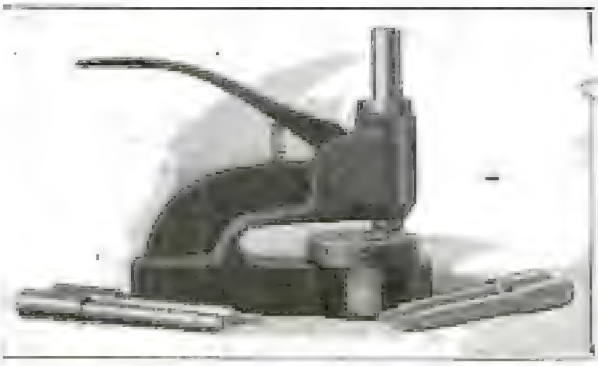
Covering 10,000 square feet of floor space, a motion-picture laboratory recently built and equipped by the Department of Agriculture for production of educational matter is said to be the only government film-producing and distributing agency of its kind. The fireproof brick structure, 90 feet long and 60 feet wide, has the second, or top, story roofed with skylights and fitted as a studio, while the first floor has various rooms for operations incident to the manufacture and distribution of the pictures.

In all there are about 15 rooms or compartments reserved for this purpose. These include offices for the title writers, storage vaults, and compartments for developing, drying, and assembling films. Apparatus for slow-motion analyses and a unit whereby microscopic objects may be visualized for portrayal on the screen, complete the camera equipment.

From a motion-picture entitled, "Exit Ascaris"—descriptive of a method for eradicating roundworms from swine—to a production labeled, "Sentinels of the Sunset"—showing the splendor of the scenery in the vicinity of Mount Lowe and Mount Wilson, in California—the films now on hand depict almost every phase of life in the countryside.

SIMPLE METAL PUNCH HAS SELF-CONTAINED DIES

A new portable metal punch of simple construction uses no separate dies and has few wearing parts. The instrument, which weighs about 5 pounds, is provided with punches for making five sizes of holes, from 1/8 to 3/8 inch, in sheet metal up to 1/8 inch in thickness, and will work to within 3 inches from the edge. In operation, the magazine die is revolved until the desired size of hole lines up with the punch, when it is secured in place by



Showing Punch in Position: Note Circular Disk of Dies, Just below Punch Point, Which Is a Feature of the Device

a thumbscrew. A blow with a hammer on the top of the punch completes the operation. The device is so constructed as to make changing the dies easy.

Copyrighted material

OXYGEN-BREATHING APPARATUS WORKS AUTOMATICALLY

A new oxygen-breathing apparatus that works automatically, even under water for a short time, is now being used by the Navy Department. The apparatus, which is self-sustaining for approximately 30 minutes under severe working conditions, consists of a steel cylinder, or flask, having a capacity of 1¾ cubic feet of oxygen under pressure of 2,250 pounds to the square inch. It is provided with control valves and a reducing valve for bringing the pressure down to about normal, a cooler in which the oxygen and inhalation air mix, a regenerator for absorbing carbon dioxide, and suitable breathing tubes.

STEEL-REINFORCED PLYWOOD APPEARS IN ENGLAND

Ordinary three-ply wood, with one or both sides covered by a sheet of steel coated with lead or zinc, has made its appearance in England. The metal sheets are attached by a chemical process. The innovation, claims the manufacturer, protects the wood, makes it fireproof, and in addition improves the structural properties. Among the many ways it is expected it may be utilized are for shelves and partitions in houses; in vehicles, for body work of various descriptions, and on farms for silos, and tanks. The material can be readily cut with a circular or small handsaw, and wire nails can be driven through it without drilling. In tests, it is claimed, the material was found to be at least 80 times as stiff as mild steel.

CLOCK WITH ONE HAND AIDS IN AVOIDING ERRORS

Designed to make the reading of time an even more simple matter, a clock with one hand has made its appearance. Between each of the usual hour markings, eleven equal divisions have been made bearing numbers from 5 to 55 inclusive, in multiples of 5, indicating the minutes. As the hand moves around the face, the point thus indicates the exact time. The makers of the instrument point to frequent errors in telling time made because of confusing the two hands of an ordinary clock. The new instrument is made up in forms suitable for use on automobiles, and in watches and desk clocks.

¶ The most powerful radio equipment afloat will be aboard the "Leviathan" when the giant ship reënters transatlantic service under the colors of the U. S. Lines some time in June. The equipment, which will be six times as powerful as that carried by the average steamship, will provide for uninterrupted communication with points 3,000 miles distant.

OIL-WELL FIRE SHOOTS 200 FEET INTO THE AIR

A fire of terrific fury raged recently when an oil well in the Okotoks oil fields of eastern Alberta caught fire, and roared continuously for 38 hours. The well was of recent origin, and for two months prior to the fire had generated the enormous gas pressure of 820 pounds per square inch. The friction of small gravel stones, rushing through the casing under this pressure, is believed to have generated the spark which ignited the gas. During the height of the fire, the peak of the flames roared more than 100 feet above the 87-foot derrick, and was visible for miles in the surrounding country. An estimated damage of $30,000 resulted from the fire, in addition to the enormous quantity of gas consumed.

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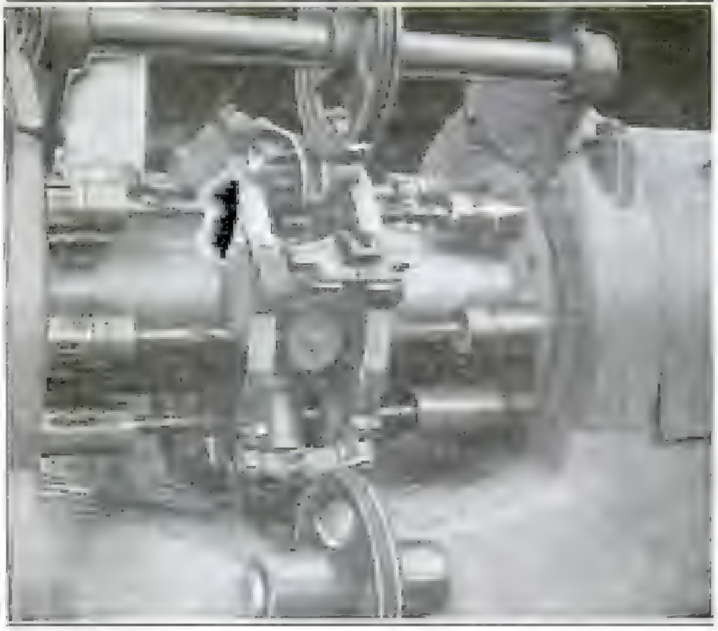
1932

The Illinois-Alberta Oil Well, in Alberta, Canada, So Named in Deference to the Home State of Most of Its Stockholders: This View Shows the Spectacular Appearance of the Fire at the Height of the Flames, Which Rose Fully 200 Feet into the Air. The Gigantic Jet of Burning Oil Roared Continuously for 38 Hours Before the Internal Pressure of the Well had Dissipated Itself

Mrs. E. M. Weber, Parkland
Alberta, Canada

NEW MULTI-SPINDLE MACHINE AIDS PRODUCTION



Partial View of Multiple-Spindle Production Machine, Set Up for Drilling Wristpin Holes in Automobile-Engine Pistons, Which can be Seen between the Two Large Flanges in the Center

A new multiple-spindle drilling, reaming, and threading machine of the drum type has been designed especially to meet the requirements of quantity production of parts like pistons, and bearing caps for automobile engines. The machine operates continuously, and all the attendant has to do is to put in and remove the work, which is carried between two large flanges and held in place by a shoe upon which a cable bears. It is not an indexing machine, as the spindles travel with the work and are moved through bushings in the flanges by a stationary cam. The machine is actually working through two-thirds of the revolution, and it is believed that, with a special attachment for loading, small parts could be speeded up to a production of 1,000 to 2,000 an hour.

PORTABLE MACHINE MELTS ASPHALT PAVEMENT

Above: Pavement-Melting Machine Mounted on Light Motor Truck, Which is Operated by an Auxiliary Steam Motor

For the purpose of speeding up pavement repairs and reducing the cost, a portable machine that softens the old asphalt surface, which is raked off previous to laying with new asphalt, is being used by a western city. A hood that extends from the rear of the light motor truck on which the equipment is mounted, covers a 4 by 6-foot area of pavement, to which it conducts the heat generated by an oil-fired brick-lined furnace extending along the top. An auxiliary steam motor is used to move the machine back or ahead a few feet, while the old asphalt is raked off.

Pavement-Repair Machine Which Carries an Oil-Fired Brick-Lined Furnace, Extending along the Top to the Overhanging Hood at the Rear

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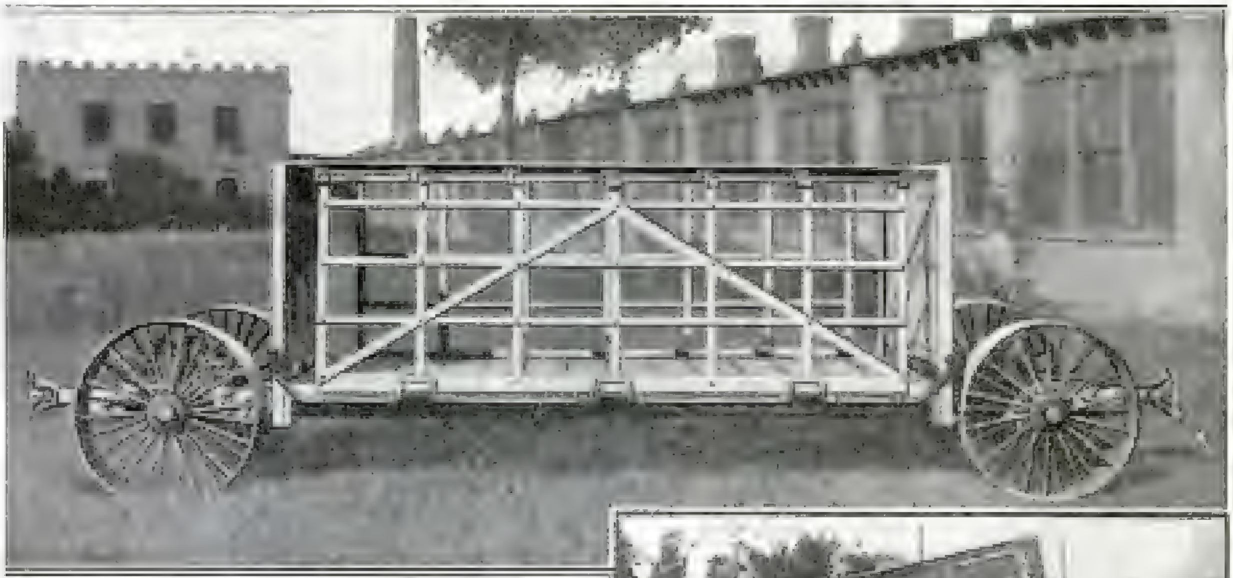
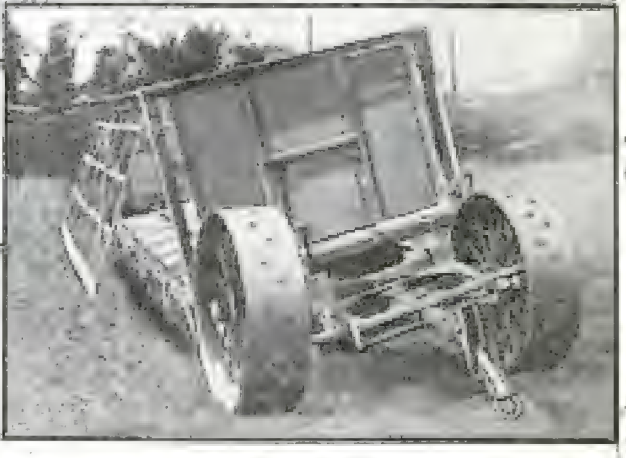
1901 Arcadia Trailer Corp. Newark, N.J.





Above: Side View of the New Trailer Truck Which Replaces the Old-Fashioned Oxcart. This Type will Handle at Least Eight Times as Much Sugar Cane, at Less Cost and with Greater Ease. Right: Both Sides and Ends Swing Outward, the End Doors Forming a Standing Place for the Loaders

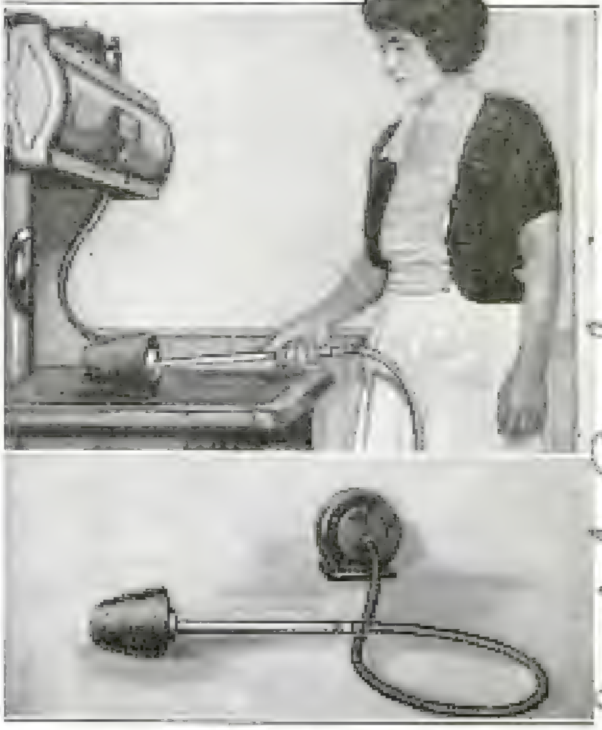
SUGAR-CANE TRAILER TRUCKS REPLACE OXCARTS

The inroads of modern equipment on old-fashioned, obsolete methods of handling sugar cane have resulted in banishing the familiar two-wheeled cart, with 7-foot wheels, drawn by oxen, and the substitution of trailers. These are to be hauled by tractors and are reversible, that is, they can be drawn from either end, singly or in trains. In operation, the end doors are lowered, forming a platform for the laborers, who pass the cane into the trailer, piling it lengthwise, the leaves having previously been stripped from the stalks. The trailer body can be quickly and easily tipped for unloading by hand screws and levers. Where previously a load of only 3 tons of cane could be drawn by oxen who moved at a speed of one mile per hour, a tractor now hauls from one to four trailers, each containing 6 tons of cane, and moving at a speed of four miles per hour.

1788

ROTARY BRUSHES TO AID THE HOUSEWIFE

An electric-driven polishing brush for use in the home is the product of an enterprising inventor seeking to lighten the drudgery of polishing stoves, silverware, and similar articles. The brush is of the rotary type, cone-shaped, and can be fitted to the motor of a vacuum cleaner, after slight changes are made in the threading of the motor's journal box.



A Light, Easily Handled Rotary Brush Which Does All the Polishing with Little Expenditure of Energy and may be Fitted to the Vacuum Cleaner

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A MILLION TREES FOR CALIFORNIA'S HIGHWAYS

1875

By H. H. Dunn 2722 Prince St, Berkeley Calif

The motorist driving anywhere over the 6,000 miles of paved highways in California soon will find himself protected by the shade of lofty trees in summer, yet warmed by the western sun in winter, for the state, through its highway commission, is planting, as rapidly as possible, a deciduous shade tree every 25 feet along both sides of every paved highway. This means that 1,267,200 such trees are to be planted to shade only the paved roads now completed within the state, while the annual increase in road building and paving in California will nearly double this number by the time the ten-year program of tree planting is completed. So far, over 200 miles have been planted, and there are more than 200 miles already shaded by older trees, set out by farmers and other residents. In the cities and some of the smaller towns, the municipal governments have assisted in this tree planting along the main highways, and it is estimated that approximately 300 miles more have been added to the highway planting in this manner, thus giving a total of some 700 miles lined with trees now giving complete or partial shade.

The means for this systematic planting was brought about by the establishment of the State Forest Nursery, near Sacramento, as a result of the coöperation of the California Highway Commission, which purchased the land, and the California State Board of Forestry, which propagates and distributes the trees. Thirty acres of land were purchased in 1921, and seeds planted, and buildings and lath houses erected, which now contain several hundred thousand trees, and by midsummer, this year, will hold nearly 2,000,000 seedlings. The principal trees raised, after some experimentation by the forestry board, are California black walnut, European sycamore, Lombardy poplar, American elm, and black locust, all of which shed their leaves in the winter, thus permitting the full heat of the sun on the highways in winter, yet providing dense and fast-growing shade in the summer.

Preference among these five trees is gradually crystallizing around the walnut, which is allowed to grow about ten years, and then is cut off and grafted with English walnut, resulting, in four years more, in a tree which has all the

A Typical Bit of Paved Highway in the "Golden State": Within a Few Years It will be Lined with Sturdy Shade Trees, Now being Set Out by the State. Above: Main Pacific Coast Highways Soon to Boast a Continuous Border of Trees

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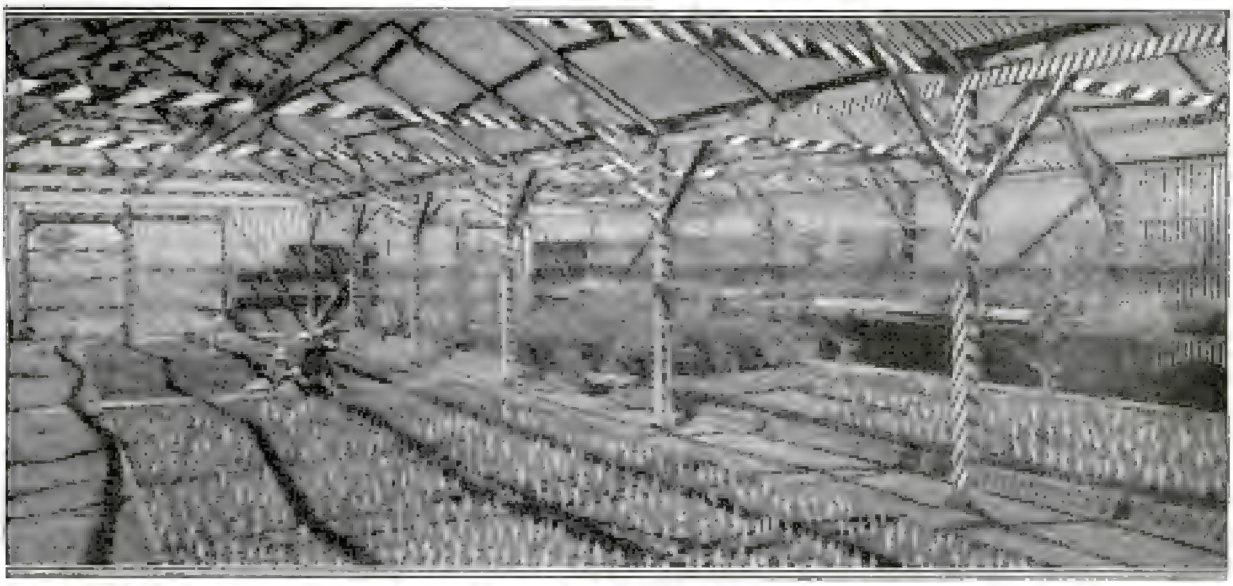

Interior View of a Part of the State Nursery Where Thousands upon Thousands of Tree Seedlings are being Propagated: Later It is Planned to Provide Farmers with Seedlings So That They may Plant Windbreaks and Decorative Groves

shade-giving properties of the wild walnut and discards its leaves in winter. Besides raising trees for the highways, the nursery also provides ornamental trees and shrubbery for the state parks, and the grounds of state-owned buildings and institutions.

The plan of planting the highways is coöperative, and involves three separate agencies—the California State Highway Commission, the California State Board of Forestry, and the agency, organization, or individual which applies for and puts out the trees. As soon as an application for trees is received from a county, city, automotive, or civic association, or other organization, it is referred to the Highway Tree Planting Committee, which consists of three members, namely, the state highway engineer, the state forester, and the gardener of the Capitol Park, at Sacramento. This committee makes a plan for the section of highway to be planted, giving the species of tree most suitable for use there, and indicating the best method of planting. Then a planting permit is issued by the State Highway Commission, and stakes marking the location of the trees are set by experts from that commission. The trees are furnished ready for immediate transplanting by the state nursery, and the applicant bears the cost of transportation, planting, and supporting of the trees by stakes. After the trees are planted they are cared for and maintained by the State Highway Commission, which replaces any that may die. The state forester supervises this work.

The response to this plan has been widespread. In 1922 the state nursery was unable to supply the demand for trees, and indications are that this year, though the number of trees ready for planting is far greater than last year, there will not be enough to supply the demand. Chambers of commerce, boards of supervisors, city councils, women's clubs, and other organizations have asked for trees, and the states of Washington and Oregon are following California's lead in this praiseworthy undertaking.

What the Result will Be After the Years have Brought the New Planting to Mature Growth: A View along an Old Highway Now Properly Paved

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Cmt. Florance L Clark, McGregor, Iowa. Eli Bridge Co. Jacksonville Ill

Clayton Brick & Tile Co. Dubuque, Iowa. 1777

EGG-SHAPED CULVERT IS SELF-CLEANING

It has long been known that egg-shaped sewers are self-cleaning, if laid with the narrow end at the bottom, but a manufacturer has now applied that principle to culverts. The small bottom concentrates even a small flow, giving greater depth, and this has the effect of increasing the velocity and reducing the likelihood of deposit. This type will retard the deposit of silt or mud very efficiently even where the slope is not great.

1779

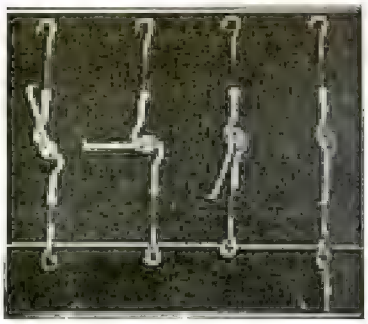
HYDROELECTRIC PLANT RUNS WITHOUT ATTENDANTS

No attendants are required at a new water-power plant built on the White River, in Indiana, operating two turbine-driven generator sets, each of 340 horsepower. A dam, 345 feet long and 10 feet high, makes available an adequate flow for the turbines. A feature is the automatic control of the generators, which are actuated by float switches. Low water will automatically cut out one of the units, and high water will as promptly start it again. In addition, all the bearings of the machines are equipped with heat controls to prevent serious injury. An overheated bearing will automatically shut down the plant before permanent damage results. Adjoining the power house is a so-called fish ladder, which permits fish going upstream to pass the dam through an ascending series of pools.

1851

NEW EXPANSION TURNBUCKLE HAS POSITIVE LOCK

An adjustable expansion turnbuckle is one of the clever and useful devices recently patented. The turnbuckle remains positively locked, when shut by means of an expansion lever which also serves as a wrench for making adjustments. The device has the same length of right and left-hand threads, all of the advantages of the usual turnbuckle, and will fit in the place of the usual type. The buckle is made in two parts riveted to an eccentric, of which the expansion lever is an integral part.



Cmt. Henry L Wood, Summitville Ind.

A Self-Operated Power Plant Requiring No Care except Periodic Inspection and Lubrication: All the Apparatus Controls Are Automatic, Furnishing Power According to the Water Level, and Insuring Safety by Shutting Down the Plant Before Any Permanent Damage can Result to the Equipment

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ACQUAINTING THE AIRMAN WITH THE LANDING FIELD

THE municipal landing field at Hartford, Conn., is here shown as pictured by an Army Air Service cameraman and interpreted by the airways section of the service, in the form in which it will be issued to airmen flying to Hartford. The field is located on a bend of the river just south of the city, which boasts other landmarks that are plainly visible to airmen. For safety's sake, attention is specifically directed to the power line and towers, which form dangerous obstacles for the flier near the field unless he is aware of their location. The field is identified by a circular marker, 100 feet in diameter, composed of a 4-foot band of crushed stone made more conspicuous by whitewash.

WORLD'S-TIME CLOCK FOR RADIO PURPOSES

At the immense new central transmitting station in Berlin, it was imperative that the sending operators should know the exact time in any other part of the world at a given moment. Some form of clock was found necessary, that would indicate day and night, and simultaneously indicate the time at all other important radio stations throughout the world. A map of the world was therefore placed on a circular glass dial, on the outer edge of which two 12-hour scales were graduated at 5-minute intervals. This dial, being darkened around half the edge, to indicate where it is night, is moved around by clockwork. Arrows extend from the stations on the map to the edge, indicating the approximate times at any given moment. The entire device, moving across the shaded area, eliminates need for calculation by the operator.

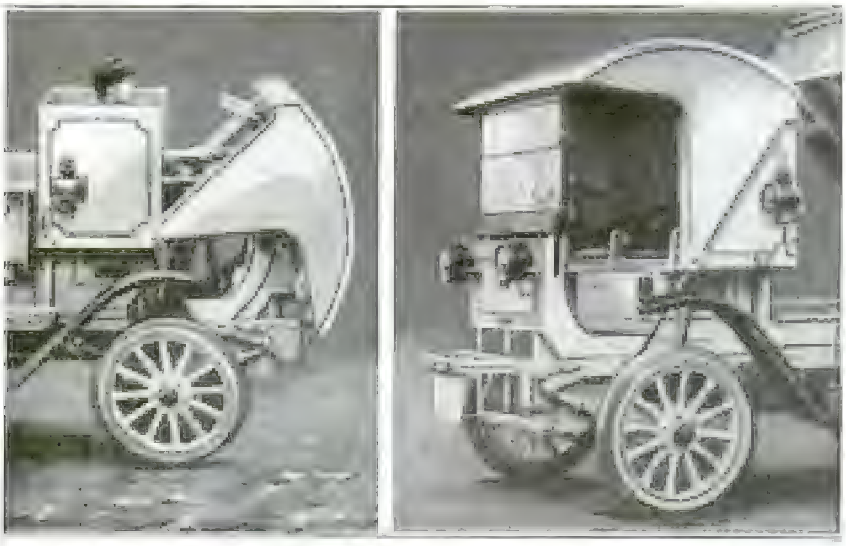
With This Form of Clock before Him, the Radio Operator in a Large Transmitting Station Knows at Once Just What Time It Is at Any Other Important Radio Station in the World

Copyrighted material

Autocar Co, Ardmore, Pa. Engineering Division Air Service McCook Field Dayton O.

CAB TOP ON TRUCK LOWERED TO CLEAR LOW BRIDGES

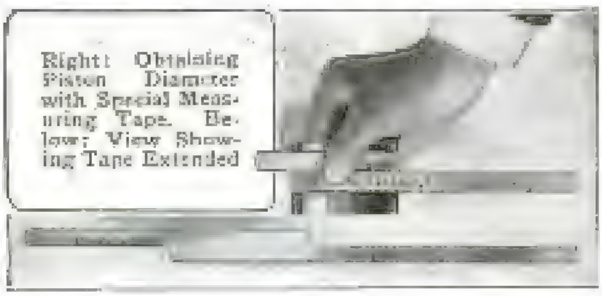
In use in Great Britain, but of American design, a motor truck is so constructed that the cab top can be swung forward to the front of the radiator to enable the truck to pass safely under low bridges. Two triangular side supports, connected with the cab top, flank the sides of the cab, to which, at about the level of the driver's seat, they are pivoted. Between the dash of the cab and the front of the top is a hinged windshield that folds up when the top is swung forward, till it comes to rest in a position no higher than the driver's head.



The Photograph to the Left Shows the Cab Top Swung Down over the Radiator of a Truck. To the Right, the Top Is Again in Place

MICROMETER TAPE MEASURES DIAMETERS

A new tape has been produced for accurately measuring the diameter of machine parts, like the pistons of gasoline engines. It consists of a flexible steel band that is wrapped around the object to be measured, and gives a reading direct to the nearest one-sixteenth of an inch, and to the nearest one-thousandth of an inch by means of a vernier scale.



Right: Obtaining Piston Diameter with Special Measuring Tape. Below: View Showing Tape Extended

AIR SERVICE PREPARES MAP FOR AIRMEN'S USE

A new map which places before the airman practically all the desired information regarding the character of country he is flying over, has just been developed by the Airways Section of the Army Air Service. Rivers, railroads, highways, and towns are marked in different colors with a suitable indication of their class and relative importance. Various degrees of ground elevation are designated by various shadings of color. Small purple dots denote landing facilities, on which sketches are found along the border of the map, while purple crosses designate landing facilities on which no sketches are available. The name of a town underscored means that there is a large building near the railroad, on which is the name of the town.

MINIATURE COPPER KETTLES MADE FROM COINS

An example of skill and patience, and the ease with which copper is worked,

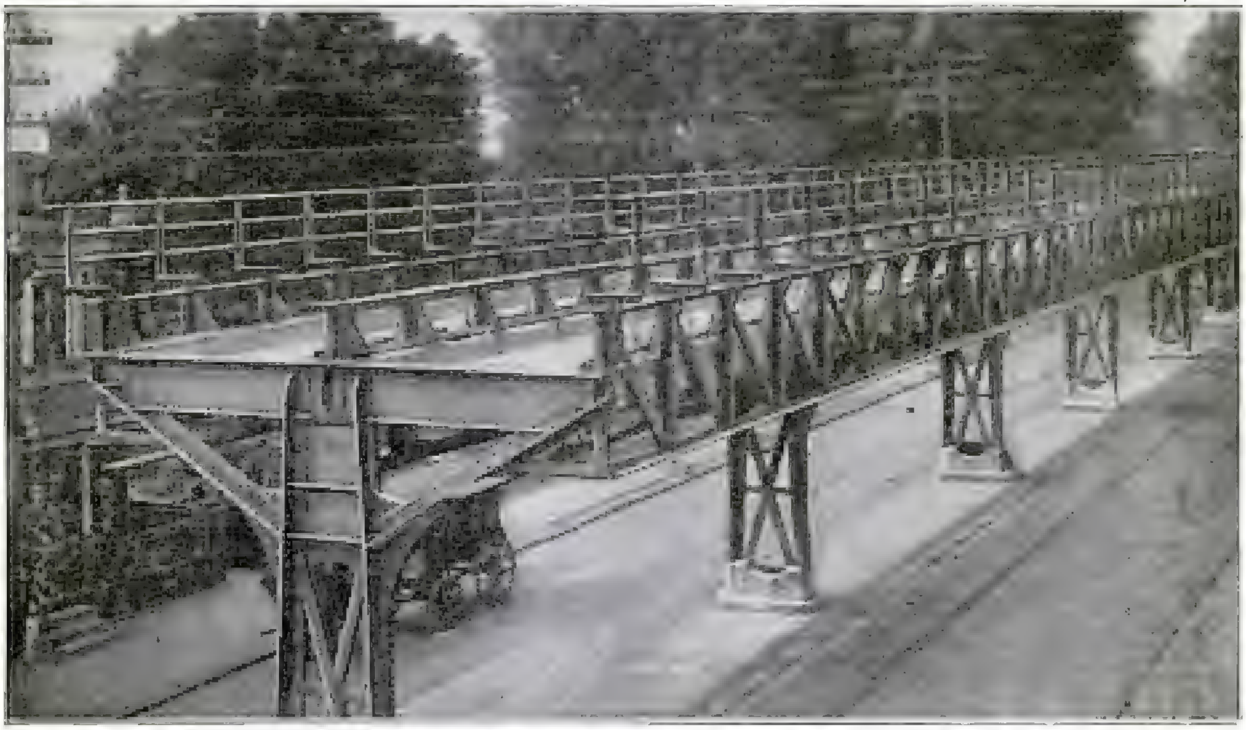
Clever Manipulation and Painstaking Care Were Necessary to Produce This Set of Kettles, Each Made from a Copper Cent

is afforded in a group of miniature kettles, each of which was hammered from a copper penny. The smallest is ¾ inch in over-all height, with a diameter at the base of ¼ inch.

¶A government wireless system, with stations probably at Grays Harbor, Wash., and at Anchorage, Alaska, is planned to supplement the service to that territory now given by the army and navy.

The Schaap Co. 344 Cumberland St. Brooklyn N.Y.

Copper & Brass Research Assn, 25 Broadway New York.



Section of the New Frankford Elevated Line in Philadelphia, in the Building of Which Every Effort was Made to Provide against Noise When the Line should Be in Operation: The Flooring Is Concrete. Supporting Posts are Resting on Concrete Foundations

PHILADELPHIANS BUILD "SILENT" ELEVATED LINE

By Wm. A. McGarry

THE "silent" elevated railway, or something approximating it, has been achieved in Philadelphia. That city has just completed and opened to the public a 6½-mile stretch of high-speed transit line that is held by engineers to be the quietest in the world. It is also of interest by reason of the advance it marks in the adoption and use of mechanical safeguards against accident.

The first contract for the work was let in 1915, and when completed, the aggregate cost of the line was $15,000,000. Of this, $3,000,000 alone was spent on cars.

Quiet operation has been achieved quite simply from the point of view of the engineer. The methods used represent a forward step in comfort and health. Pedestrians may converse without effort while a seven-car train passes overhead at full speed. There is a noise, but it is more like the distant boom of a big gun than the familiar high-pitched clatter of a passing train.

In the Frankford line, two major developments were made on the structure itself in addition to the improvements in the cars. The first was to fill the interstices of the H-beam uprights, on which the road is carried, with concrete. Various experiments have shown that such beams act as sound transmitters, carrying to the pedestrians vibrations that otherwise might have been dissipated in the air above. The second change was in the support for the rock ballast in the roadbed. Instead of using the familiar bolted latticework of steel, the engineers put in concrete arches. The result was

General View of the Interior of One of the Stations on the New Philadelphia Elevated Railway: Entrance to Platform Is from Upper Level

Copyrighted material

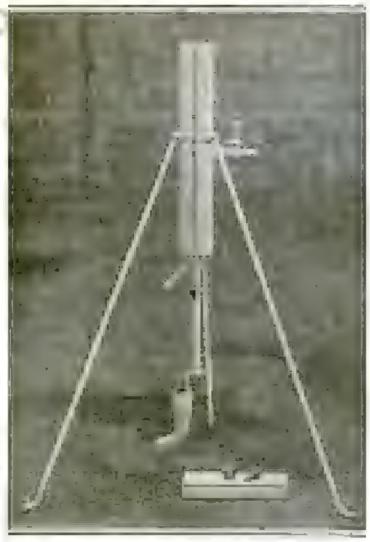
a structure almost as solid and vibration-proof as masonry.

For about a mile near the terminus, the line runs through a part of Frankford Avenue, which is so narrow that a center-column structure had to be used. Even here the engineers managed to attain an unusual solidity. A special type of column was designed, supported below the street surface by plate girders that in turn rest on concrete piers 12 feet apart. The result has been a considerable deadening of noise even when the old-type cars are used.

The new cars are similar in some respects to those in use on the later lines in New York, but they have some additional safeguards. Fully automatic couplers were installed, the use of which not only eliminates the necessity of brakemen standing between the cars when trains are being made up in the yards, but also equalizes the speed of each car so that the train acts as a unit. It makes for less noise and more comfort. Another step in that direction is dual control of the air brakes, one of the old type, and the other electrical, the latter being instantaneous. In the old equipment, when the motorman applied the brakes, the first car in the train was the first to slow down. The second car bumped into the first, and so on throughout the length of the train.

PORTABLE INSTRUMENT GAUGES TANK CAPACITIES

A portable instrument has been invented and marketed recently which quickly and conveniently determines the capacities of large tanks of irregular shape, without special measurements and calculations. The device is mounted on a tripod, and is equipped with a stop watch, and inlet and outlet valves. In use, the instrument is placed over the manhole of the tank to be calibrated, and a suitable nozzle, whose rate of flow is known in advance, is fitted to it, whereupon water is turned on. When the tank is full, the elapsed time is carefully noted with the stop watch, and the total quantity of water passed is determined from a set of tables.

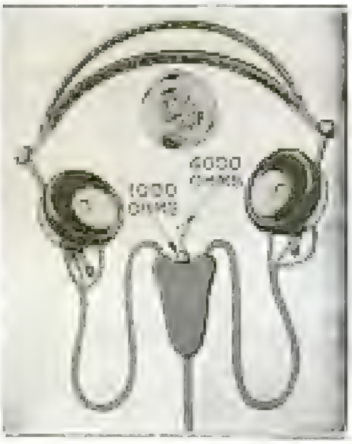


FREEZING BEFORE FORCING IMPROVES RHUBARB

Recent experiments have shown that rhubarb of exceptional tenderness can be grown from roots that are allowed to freeze before forcing their growth in a warm, moist atmosphere. The explanation is that the plants do better after undergoing a rest, and that freezing provides the necessary dormant period during which nourishment is stored. The plants can be packed in moist sand and grown in a warm cellar. While the quality of the stalk is the same for plants grown either in the dark or the light, those grown in the dark have a very small leaf.

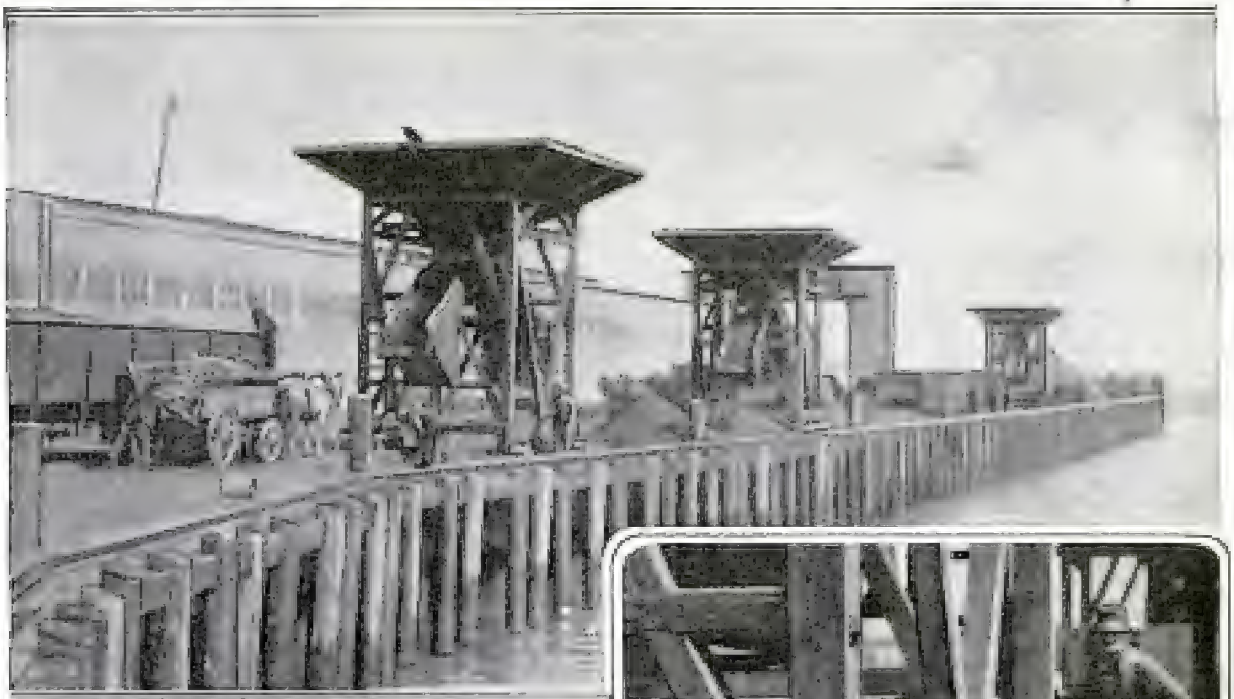
RADIO HEADSET HAS WIDE RESISTANCE RANGE

The so-called "cracking" or rattling of the diaphragm common to most radio telephones is eliminated in a new type of headset, which uses a four-pole, instead of the usual two-pole construction. This affords a resistance range of 1,000 to 4,000 ohms, making it suitable for the high resistance found in a vacuum-tube set as well as for the low resistance of a crystal set. The poles of this improved headset are slotted their full length, in quarters, improving the tonal reproduction.



¶Oil-burning ocean vessels without large funnels are said to be regarded skeptically by Russians, Poles, and their neighbors, when about to emigrate to the United States. More often than not, in spite of explanations, they insist on using boats with smokestacks.

State Harbor Board, San Francisco Calif.



A View of One of the San Francisco Coal Docks, Showing the Unloading Towers Lined Up for Duty: Being Mounted on Rollers, They can be Shifted About Easily

Close-Up of the Steel-Roller Bearings, of Which Six are Located under Each Coal Tower: Details of the Swivel Arrangement may Also be Seen

1910

ROLLER-MOUNTED TOWERS UNLOAD COAL SHIPS

Unusually heavy shipments of coal and coke coming into San Francisco by steamer made necessary a change in the design of the coal-handling towers in order to speed up the unloading of the ships. These towers were so heavy and cumbersome as to be moved only with great difficulty. It was decided to mount each of them on six heavy steel rollers to make them more easily portable. The rollers used were 8 inches in diameter and 3½ feet long, grooved deeply around their circumferences to receive the bearing of the tower supports. Iron bark, one of the heavy and tough woods, was used as bearing material. A steel plate, well lubricated, lying between the two parts of the bearing, permits it to be swiveled like a chair caster.

1956

RADIO AND PHONOGRAPH SETS IN TABLE LAMP

Ingenious adaptations of radio outfits continue to appear on the market, one enterprising inventor having fitted up a table lamp to include both a radio set and phonograph in its base. No aerial is required, as the lamp is made of copper; neither are batteries necessary. One of the special features of the outfit is the use of a magnetized diaphragm, built like a camera shutter, which can be opened or closed in order to vary the volume of sound. A door on the lamp base conceals the interior, thus effectively hiding the inner mechanism.

Right: Combined Lamp, Radio Set, and Phonograph, Said to Be the First of Its Kind Invented. Left: Magnetized Diaphragm for Varying the Sound

Inv. H. W. Hochstetter, Dayton, Ohio.

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1686 Kilroy Harris American
Australasian Bureau
Box 516 G. P.O. Chicago

PEARL FISHING OFF WESTERN AUSTRALIA

Group of Pearling Luggers Anchored outside Broome, on the Northwest Coast of Australia; In the Town One Finds Asia and the East Indies Fully Represented; for of the 2,500 Total Population, 1,500 Are Colored Aliens, and Mostly Employed in Pearl Diving

These Pearls Are of Various Grades. Other Qualities Being Equal, the Nearly Spherical or Symmetrical Pearls Are the More Valuable. Some of the Ornaments Carved from the "Baroques," or Irregularly Shaped Pearls, are Also Shown

One of the Divers About to Descend: Upon His Reaching Bottom, a Basket will be Lowered to Him for Use in Hauling Up the Shells. The Diver's Pay Is in Proportion to the Number He Collects. Some 120 Feet Is Usually as Deep as He Dares to Go. At Any Depth He can Stay under Water But a Short While

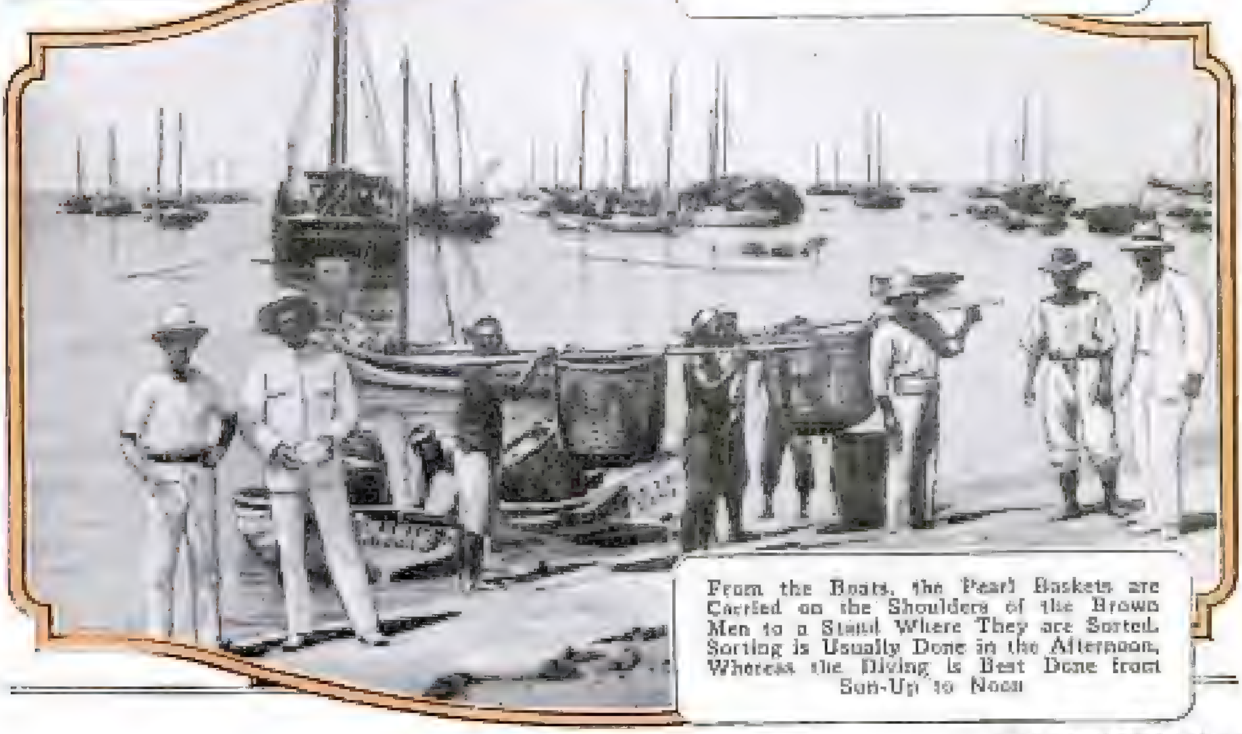
Copyrighted material

1686

PICTURESQUE AND THRIVING INDUSTRY

Certain of the Shells, When Opened, may be Found to Contain a "Blister," as Shown to the Right. This may Cover a Valuable Pearl or, More Often, a Misshapen One. Above: A Close-Up of a Blister

Whether or Not Pearls are Found, the Shells are Brought Ashore. The Pearless Shells are Later Exported to Cities throughout the World to be Made into Pearl Buttons of Various Descriptions



From the Boats, the Pearl Baskets are Carried on the Shoulders of the Brown Men to a Stand Where They are Sorted. Sorting is Usually Done in the Afternoon, Whereas the Diving is Best Done from Sun-Up to Noon

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WATER-SUPPLY INTAKE LINE FLOATED INTO POSITION

Floating into position 1,500 feet of 14-inch pipe in a continuous length composed of 30-foot sections, was an interesting piece of construction successfully accomplished in connection with a recently completed intake for the water-supply system at Peoria, Ill. The Illinois River at this point flows through a channel that is 22 feet deep 20 feet from the shore, but owing to the water received from the Chicago Drainage Canal, the stream overflows a flat, formerly a cornfield, to a depth of 3½ to 4 feet, and forms a shore line 1,500 feet from the edge of the channel.

The first step in the installation of the pipe line, which extends from a concrete pump pit on shore to a point just beyond the edge of the main channel, was the construction of two barges, 12 feet long, 4 feet wide, and 2 feet deep. The barges were then connected by 4 by 6-inch timbers which held them 30 inches apart. On each barge was erected an A-frame. Across the top of the A-frames was fastened a beam, to the center of which was attached an eyebolt for the suspension of a chain hoist. Then, near the shore and in line with the concrete pump pit, were placed two bucks similar to the ordinary sawbuck. The first length of pipe, the outer end of which had been closed with a blind flange and chained to the cross beams between the barges, was allowed to rest on the bucks, while a second length was brought from shore and bolted to its open end. When this was completed the second length was pushed ahead onto the bucks and across the barges out into the stream. The process was repeated until the barges were 1,500 feet from shore and the pipe line lay floating on the water with one end chained to the barges and the other resting on the bucks. Under these conditions it was possible to anchor the barges over the desired intake location, and, after removing the blind flange, attach a suction length consisting of a swivel elbow and strainer. The shore end was then taken from the bucks and bolted to the pump

Rolling Last Length into Position for Attachment to the 1,500-Foot Pipe Line Which is Shown Floating on the Water

Workmen Bringing from the Shore, at the Left, a 30-Foot Section of 14-Inch Pipe to Connect to the End of the Intake Line Resting on the Bucks at the Right: The Line Floats with Its Outer End Chained to Barges

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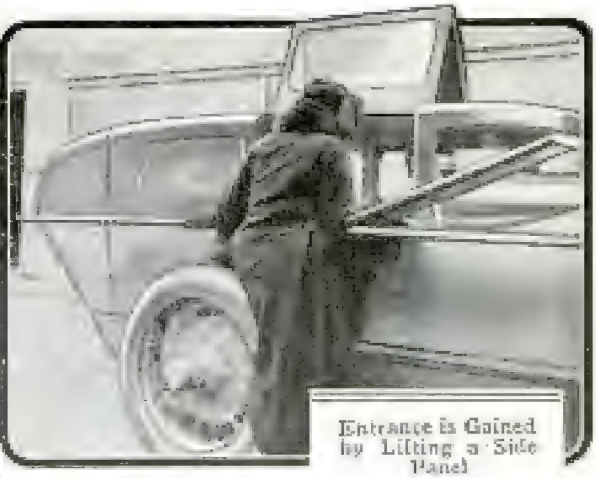
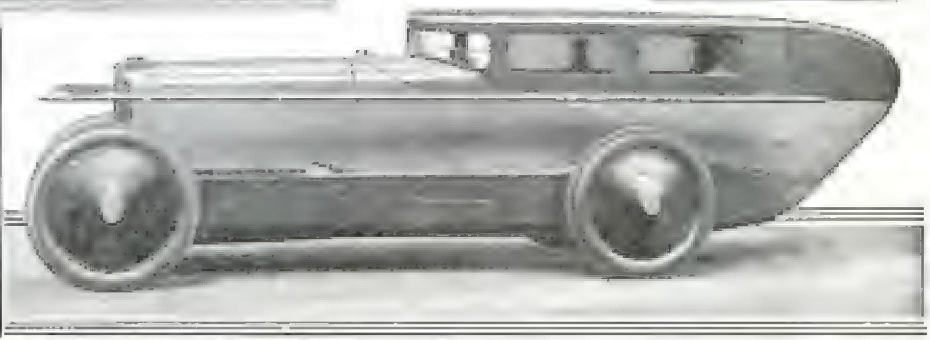
Harman Bros, Paris France



Entrance is Gained by Lifting a Side Panel

Above: The Rear Portion of the Car Swings Upward, Disclosing a Compartment for Two Spare Tires. Right: A Side View of the Automobile Which is Believed to Embody the Latest Development in Scientific Streamlining. The Car was Designed in Collaboration by French and English Engineers



PHOTOS BY MEURISSE, PARIS

suction, with the joint cracked sufficiently to provide for a vent. By lowering on the chain hoist attached to the A-frames of the barges, the whole line gradually sank until it rested on the bottom. Anchors, composed of two 1-cubic-foot blocks of concrete joined by a chain, were placed at 100-foot intervals along the line, and thus the pipe finally imbedded itself firmly in the muddy bottom of the river.

2044

NEW TYPE OF FRICTION CLUTCH ENDS JERK

Improvements in the wood-shoe friction clutch are claimed for a new type recently brought out in Germany. The clutch features a specially designed, highly elastic S-spring inserted into the clamping mechanism. This, by reason of its great resilience, is said to overcome any jerk when the clutch is engaged, thus avoiding breakage of the clutch itself as well as the machine controlled by it. Moreover, the new clutch is greatly reduced in size and weight, and the clamping pressure, in the dead-point position, is only slightly in excess of what it is when the clutch is completely thrown in. The special spring also enables the clutch to be thrown in readily under any load.

STREAMLINING CUTS DOWN HEAD RESISTANCE

1980

Concentrating their attention on scientific streamlining, Franco-British engineers have designed a most unusually shaped automobile which, they believe, will prove very speedy, since head resistance to the wind has been cut down considerably. The body is built of duraluminum, a new light alloy, and aluminum on a system like that used in making airplane fuselages. The under part of the car is incased in sheet aluminum, only the brake drums and axles projecting. Entrance is gained to the car—powered by a six-cylinder motor developing 200 horsepower—by a side panel, and by a part of the roof and a section of the fender being hinged and, so, easily raised. The entire car weighs only about 3,000 pounds.

¶Experiments in growing rubber trees are expected to be the first concern of the Department of Agriculture on its test farm at San Diego, Calif., land for which has been chosen and a lease asked from the city by the government. The new station will propagate many foreign plants used in various industries, and conduct experiments for the purpose of discovering rubber substitutes.

Manchester Guardian Commercial 8/29/23

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1922 The Federal Fire Engineering Co. San Francisco Calif.

CURTAIN OF WATER FIRE IN

BY CHAS.

AN effective method of extinguishing fires that occur in oil that is stored in large open-top tanks, recently demonstrated that a fire of considerable proportions could be quickly put out by a curtain of water properly applied. The features of the method lie in water distributors and their arrangement for covering the surface of the burning oil with an unbroken sheet of water that prevents air from reaching the source of the fire. The action of the spray nozzles is assisted by mist formed from the impact of the fine water jets against the sides of the tank and by some of the water being converted into steam due to the heat from the burning oil.

The water distributor, which is made of heat-resistant metal, consists of a nozzle with an orifice restricted by means of an inverted conical-shaped disk with a threaded stem that is screwed into a cross rib through the central opening in the nozzle body. Several small holes through the stem and outer face of the conical tip provide for additional jets of water. This type of nozzle produces a high-velocity spray that forms a sheet

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1972

QUICKLY PUTS OUT OIL TANK

W. GEIGER

of water radiating out from it in a horizontal direction.

In one of the tests, the flames from 850 gallons of oil which had been burning for five minutes, were extinguished in less than five seconds with 25 gallons of water. The accompanying illustrations, in the order they are numbered, show an oil-tank fire which had been burning for four minutes; the fire just after the water had been turned on and the curtain of water had extended over the surface of the oil; the action of the water curtain in checking the fire, two seconds after the sheet of water had spread over the fire, which, it will be noted, is practically out; the effect three seconds later; the appearance 10 seconds later, and the water issuing from the nozzles shortly after the pressure was shut off.

¶ Stating that the development of aerial and submarine sound generators offers a large field for scientific effort, a member of the National Research Council's committee on acoustics has proposed an experimental ship to be equipped for research in this phase of marine physics.

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1883

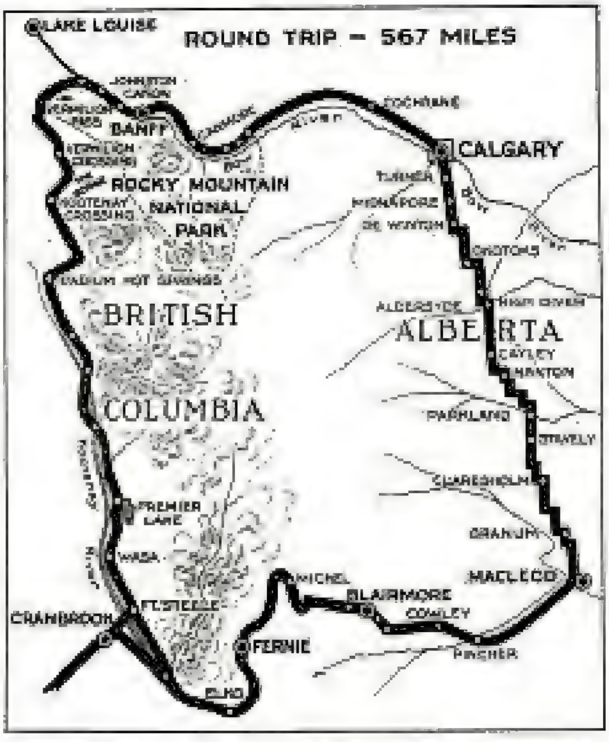
A Construction View on the Banff-Windermere Highway, Indicating the Mountainous Nature of the Country: In the Left Foreground a Portable Bucket Loader can be Seen Elevating Material from the Roadway and Depositing It into a Wagon for Removal

LAST LINK IN 6,500-MILE HIGHWAY COMPLETED

Mrs. Parkland Alta, Canada

By E. M. WEBBER

WITH the official opening of the Banff-Windermere Highway in the Canadian Rockies, scheduled for the near future, the last link in a 6,500-mile chain of scenic roadway will have been welded into place, making an unbroken circuit from California to Canada and return. Thousands of Americans will, no doubt, be attracted by this tour, as it passes through Grand Cañon Park, Yellowstone National Park, Glacier Park, and the Shuswap Indian Reserve in western Canada, and traverses part of a most picturesque country. From Macleod, in southeastern Alberta, a "rectangular" route can be covered, including the beautiful 93-mile link from Banff to Windermere, just completed. One side of the rectangle runs north from Macleod, crossing many streams, through Parkland and Midnapore to Calgary. Here the road makes a great winding turn in a generally westerly direction toward the wonderful country surrounding Banff. After leaving this latter town the road soon begins to run south, ascending steadily past Sinclair Pass, which divides the Brisco and Stanford ranges. Vermilion Pass, the highest point on the trip, is just ahead with an altitude of 5,376 feet. The fourth, or southerly side of



A Scenic Route for the Motorist Who Enjoys the Beauty of Mountainous Country: Banff Is in the Northwestern Corner of the "Rectangle"

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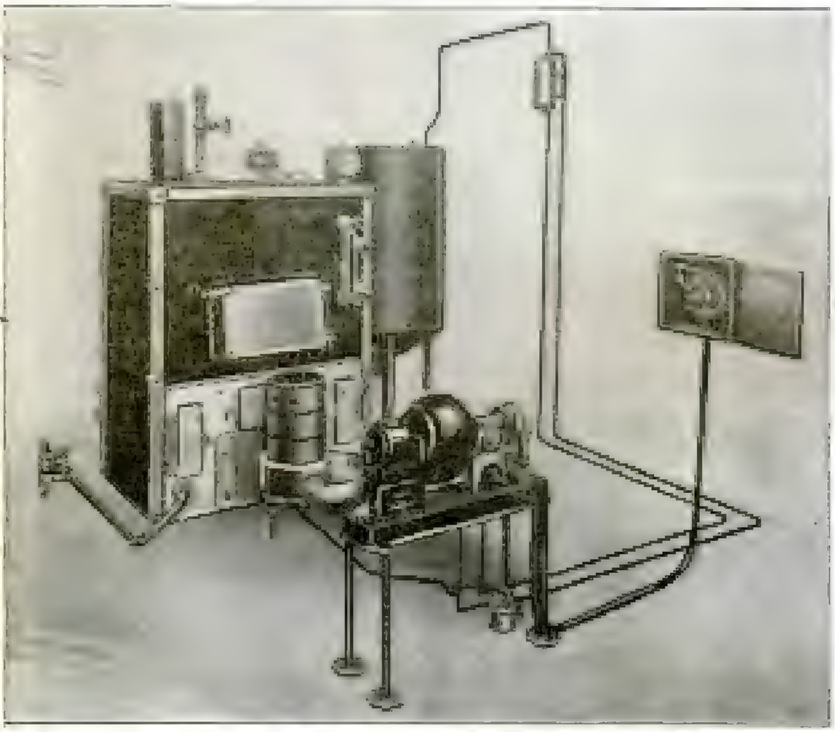
1883

On the Road between Banff and Lake Windermere, near Radium Hot Springs: Towering Cliffs Flank the Highway That was Literally Blasted Out between Them

Copyrighted material

the rectangle begins after Fort Steele is passed, near Elko. Here the highway swings sharply to the north, as if it had lost its sense of direction, but, recovering at Michel, it turns east, making a sharp "corner" again at Pincher, and reëntering Macleod, the starting point, from the southwest. Every part of this 567-mile circuit passes through regions of great natural beauty, and the motorist cannot but feel well rewarded after making the round trip. The route is conceded to be one of the finest in Canada by those familiar with its scenic highways.

OIL HEATER USES SEPARATE COMBUSTION CHAMBER

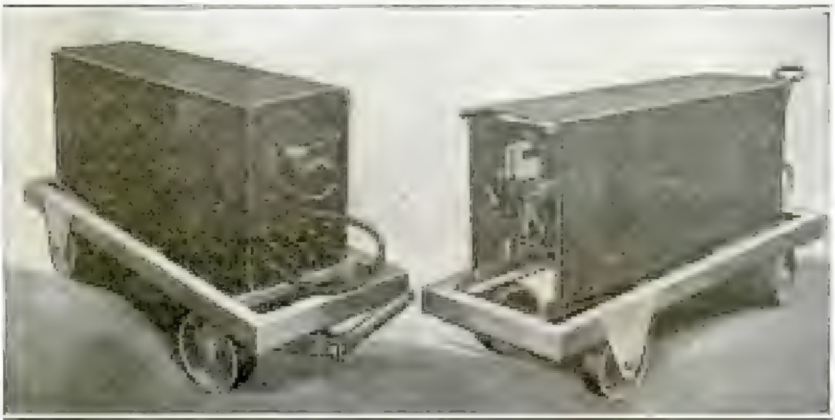


The Separate Combustion Chamber In the Small Cylindrical Tank Directly in Front of the Heater. A Rheostat on the Wall, Connected to the Temperature Regulator, Governs the Speed of the Motor Running the Air Blower

The necessity of lining with firebrick or clay the fire box of oil-burning boilers and furnaces is eliminated in a new type of burner which uses a separate combustion chamber. An additional advantage of this burner is that combustion is localized and intensified in the separate chamber, having the effect of muffling the roaring noise of burning oil. A motor-driven air blower maintains the proper air-to-oil ratio, and a centrifugal type of oil governor, mounted on the blower shaft, controls the oil feed. If the current should fail, the motor would, of course, stop, causing the weights of the governor to drop, closing the oil valve.

NEW DEVICE LOWERS VOLTAGE FOR ARC WELDING

A new device designed for using arc-welding apparatus in connection with 500-volt direct current, such as is available on many electric railways and in some industrial plants, consists of a resistor-reactor that operates in connection with a potentiometer. The potentiometer voltage, minus the arc voltage, determines the dropping-out voltage which may be set at some such value as 30 or 40 by means of special resistance and adjusted to a fraction of a volt. It is said to maintain a reliable ¼-inch arc without objectionable flashing and the resulting crater.



Two Views Showing Opposite Ends of the New Resistor-Reactor That Operates in Connection with a Potentiometer to Reduce Direct-Current Voltage to a Value Suitable for Arc Welding

Electric Arc Cutting & Welding Co., 152 Jelliff Av., Newark N.J.

Copyrighted material

1644 Chas. Cary Rumsey
Studio Garden Wheatley Hills
L. I.
N. Y.

These Panels Easily Convey the Impression of Vigorous Outdoor Beauty. They are Molded in Appropriately Colored Cements, and Adorn the Studio Garden Wall of Charles Cary Rumsey, a New York Sculptor, at His Estate in the Wheatley Hills of Long Island. Note How Well They Harmonize with Their Setting

COLORED FIGURES ADD LIFE TO CONCRETE WALLS

1644

BY ARTHUR JONES

DECORATIVE panels for concrete walls on suburban estates may be developed to such a point as to form a most attractive feature. This conclusion was reached by a New York sculptor, Charles Cary Rumsey, after making extended experiments on his own estate in the Wheatley Hills of Long Island. What would otherwise be bare and unattractive gray walls are transformed by the magic of colors and lifelike figures into ornamental features that add greatly to the beauty of the lawn or garden. For the walls of his estate, the artist selected for panels and borders the figures of graceful Grecian dancers, vigorous animals and flying birds. The first problem he had to solve was how to put the colored concrete into molds. He determined that the relief must be simple and broad and not too sharp. One of its special charms must come from a softening and blurring of the outline through the peculiar rough nature of the concrete.

This Panel Is in Relief, and Illustrates How Effectively Colored Cements may be Used for Tinting Molded Figures. The Sculptor has Used Birds to Produce an Outdoor Effect

In making the panels, the sculptor has used many colors, that is, each panel is in a different color scheme. One panel, for instance, is in black and white, another in light and dark blues, a third in contrasted greens, and so on. Wild horses,

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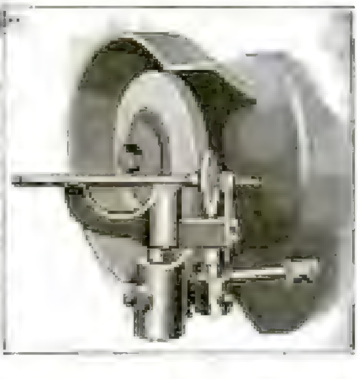
Flying Birds, Leaping Beasts, and Dancing Nymphs Are the Effective Mediums Which the Sculptor has Used to Add Color and Life to the Gray Walls. The Vigorous Action Portrayed in the Panel Is in Keeping with Its Surroundings, Also Supplementing Its Beauty

bulls, giraffes, pelicans—all in motion—are vividly portrayed in appropriate colors. Just how well these colors will stand exposure remains to be seen, though one panel that was built four years ago, has, so far, shown no deterioration through weathering.

EMERY-WHEEL ATTACHMENT FACES VALVES

The need of special and expensive grinding machinery for the facing of valves is eliminated by the use of a simple emery-wheel attachment which is about to be placed on the market. Valve and stem are supported in a small bracket easily attached to the grinding-wheel frame, and vertical, horizontal, and rotating adjustments are provided to bring the valve face into proper contact with the emery wheel. A sheet-steel safety guard envelops the wheel and keeps the grindings within bounds.



ONE-SHEET WRITING PAD MADE TO LAST "INDEFINITELY"

1077

A small writing pad which can be used "indefinitely" without renewal has been patented recently. The device is made of a sheet of cardboard covered on its upper side with a blue-wax composition. Over the wax is a sheet of strong tissue paper, and on top of this a sheet of a transparent substance resembling celluloid. This upper sheet, when written on with a blunt instrument, causes the tissue paper to stick to the wax, making visible the writing. To "erase," the tissue paper is lifted off the wax, neither retaining any impression.

The "Everlasting" Writing Pad: Lifting of the Central Tissue-Paper Sheet Causes the Writing on the Celluloid Top Sheet to Disappear

Mystic Novelty Co. Cedar Rapids, Iowa.

1816 Ing.-Prof. Frank L. Snow, Dept. of Industrial Journalism,

Oregon Agricultural College, Corvallis, Oregon.

HENS REGISTER EGGS WITH NEW DEVICE

Hens may now "write" their own egg-laying records by means of a device recently invented. It consists of a trap nest inclosed in a sheet-iron box, 36 inches long, 14 inches wide, and 20 inches high. The recording attachment is a rubber stamp bearing the hen's name or number, which is fastened to its back by wire loops. When the hen enters the nest, the stamp rubs against an ink pad. As the hen advances a few inches farther, the stamp makes an impression on a strip of paper running upon two rolls. Immediately beyond is the door of the nest proper, and as this is opened, the paper is automatically moved forward the space of one impression. The egg rolls down into a small trough extending from the base. The arrangement permits accurate check by the owner.

Left: Hen Entering Egg Register; Note How Stamp Attached to Its Back Rubs against the Paper. Right: Side View of Nest, Showing Tray in Which Eggs are Collected

1401

MINING ALABAMA COAL WITH STREAM OF WATER

For the first time in Alabama, hydraulic mining of coal has been resorted to at Alco, for loosening and breaking down the banks of a surface deposit, eliminating considerable hand labor. In this case, stripping operations with machinery would have been too expensive, consequently a small steam-power station was erected near an adjoining creek for pumping water to the coal site. Cast-iron pipe is used to bring up the water, and a stream of great force is shot against the bank, loosening the coal so that it can be handled easily. This system has been used with great success for mining operations elsewhere.

Above: The Force of a Stream of Water under High Pressure is being Used to Break Down the Bank of This Coal Deposit, Making It Easy to Handle. Below: A Section of Cast-Iron Pipe, Conveying the Water

Cut. Will W. Nelson 2509-15th Ave. N. Birmingham, Ala.

2026

A Sectional Interior View of the Tunnellike Passageway, Which will be Built under the New Addition to the Edgewater Beach Hotel in Chicago: It Leads into an Underground Parking Space and Storage Area, Lying Directly under the Plaza That Connects the Two Main Sections of the Structure, and Is Solely for the Guests' Convenience. This Storage Area will Be Two-Thirds of an Acre in Extent

Copyrighted material

Architects - Marshall & Fox
721 N. Michigan Ave.
Chicago

UNDERGROUND PARKING SPACE FOR HOTEL GUESTS

BY H. S. GRASSMAN

AN unusual innovation in hotel construction characterizes the plans for a new addition to the Edgewater Beach Hotel, in Chicago, ground for which has already been broken. The site, one of the choicest in the city, extends through from Sheridan Road, a popular driveway, to Lake Michigan, affording a wide vista over the lake's waters. In keeping with the nature of its patronage, largely of a resident character, the hotel management has devised an unusual scheme for adding to the structural convenience of the entire layout. Between the existing structure and the new addition, hidden underground, a large parking space and storage area for the guests' automobiles will be laid out, covering about two-thirds of an acre. Entrance to this subterranean garage will be through a street-level portal on one side of the new structure, and a tunnellike driveway, 70 feet long, will pass under the building, running level a bit, then inclining downward and into the underground area. From the surface no trace will be evident of this unusual feature of hotel construction. To the eye, there will be visible only the wide beautiful plaza which will span the space between the old and new buildings, and the low connecting structure which unites them. The latter is shaped like a cross, one arm being a passageway floored with art marble, and the other arm containing a lounge room and a conservatory. The conservatory fronts on the lake, the entrance from that side being a terraced plaza. Between it and the lake a marble dance floor will be laid out, for outdoor dancing in the summer. In conformity with the appointments and fittings of the present structure, one of the most attractive hotels in the city, the entire program calls for an establishment of luxurious comfort, unusual conveniences, and striking beauty. The entire plat area is almost five acres in extent, and permitted the designers a wide latitude in its architectural possibilities.

1926

DRYING UP OF OWENS LAKE REVEALS NEW WEALTH

Owens Lake, one of the great inland salt seas of California, located in Inyo County in that state, is rapidly shrinking in depth and area, and is doomed eventually to disappear. Maps printed perhaps within another decade will indicate the former location of this picturesque desert sea by a dotted line, and in the bed of the lake will be located numerous salt, soda, and potash plants, forwarding trainloads of these valuable materials into the avenues of commerce.

The disappearance of Owens Lake is the inevitable result of one of man's great engineering enterprises—the utilization for irrigation purposes of the fresh water supplies which originally served the lake. Although lying at an elevation of 3,569 feet, this body of water has no outlet. Following some prehistoric upheaval of the earth's crust, the Owens River, which is made up of innumerable streams trickling down from the mountains, was forced to discharge its waters into the immense basin formed in the Mojave Desert, and the resultant sea is now known as Owens Lake. Although fed with fresh water, the lake, having no outlet, heretofore lost its waters only by evaporation. Its level has been maintained by the balance between the rate of evaporation and the amount of fresh water flowing into the lake. Naturally the water is very salty.

But that balance is now destroyed. Aside from the taking up of the little feeder streams by the irrigation of farm lands in the semiarid Owens Valley, by the building of the Los Angeles aqueduct the Owens River was taken away bodily through 286 miles of steel pipe and open ditches into the city. Such inroads upon the supplies of fresh water draining into the lake make the rate of evaporation far in excess of the quantity supplied. The level of the lake has fallen about 20 feet. With the receding of the lake, its waters have become increasingly saline. A number of salt, soda, and potash plants have already sprung up around the shores on locations that formerly were part of the lake bottom. These plants are now doing a profitable business. When the lake will have disappeared entirely, it is estimated that some 500,000,000 tons of salt, soda, and potash will be available.

¶Following a decision to expend $20,000,000 during the next 10 years, on improvements to the Suez Canal, the channel will be deepened at once from 31 feet to 32 feet, and as soon as possible to 35 feet. The banks are to be 200 feet instead of 150 feet apart.

Hogg & ... 416 Union League Bldg Los Angeles Calif

Cml. Walter S. Jordan
Weymouth, Mass

1427

Latest Totem-Post Addition to Harvard's Museum: These Posts were Carved from Cedar by Means of an Instrument Resembling an Adz. The Figures have to Do with Legends and Stories of Now Vanished Tribes

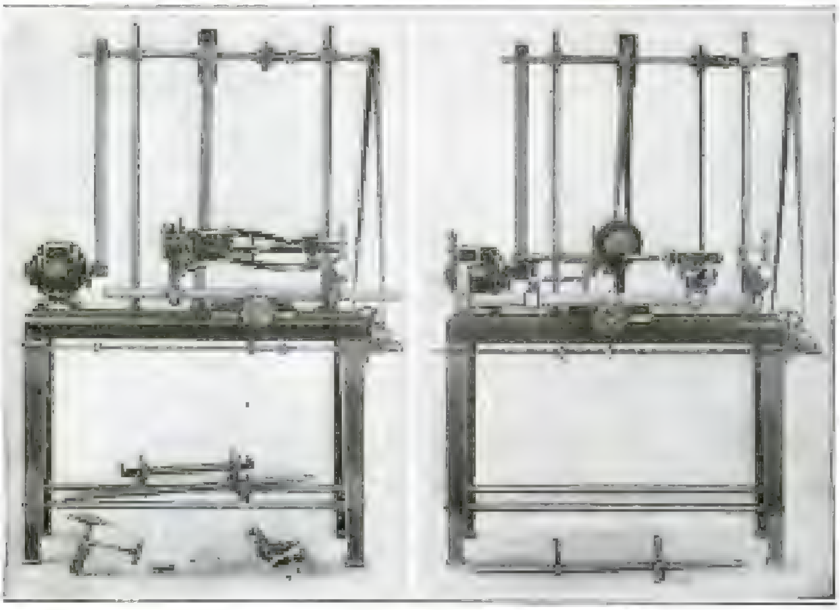
NEW TOTEM POST ADDED TO HARVARD MUSEUM

The Harvard College Indian Museum has come into possession of a totem house post from the Kwakiutl Indian tribe in the Northwest of Canada. This house ornament, together with the two house posts previously acquired, forms one of the most valuable additions to the collection. It stands about 17 feet high, with the upper part carved to resemble an eagle poised for flight, and weighs approximately two tons. A legend tells that an ancient tribal leader was erecting a house when a "thunder bird" alighted near by. From the bird's neck appeared a man who helped the tribesman erect the totem posts used in building the lodge.

1839

AUTOMATIC GRINDER FOR LAWNMOWER BLADES

An interesting grinding machine has been devised recently, which has almost equal precision in grinding lawnmower and ledger blades, paper cutters, planer knives, and similar tools. The grinding action on this machine is entirely automatic; even when a lawnmower reel is set up, with its curved blades, no further attention is required until all the blades have been ground twice. At this stage a bell rings to notify the operator, who may deepen the cut and repeat the process by a slight turn of the feed screw. Arms are provided for gripping various-shaped blades by means of three contact points at each end, with a leveling adjustment to insure accuracy. The machine will also grind other tools.



An Automatic Grinder for Tool and Lawnmower Blades: To the Left the Machine Appears Complete for Grinding Mower Blades; to the Right a Reamer is Shown in Position for Grinding

Erwin Balmer. Aledo, Ill.

Copyrighted material

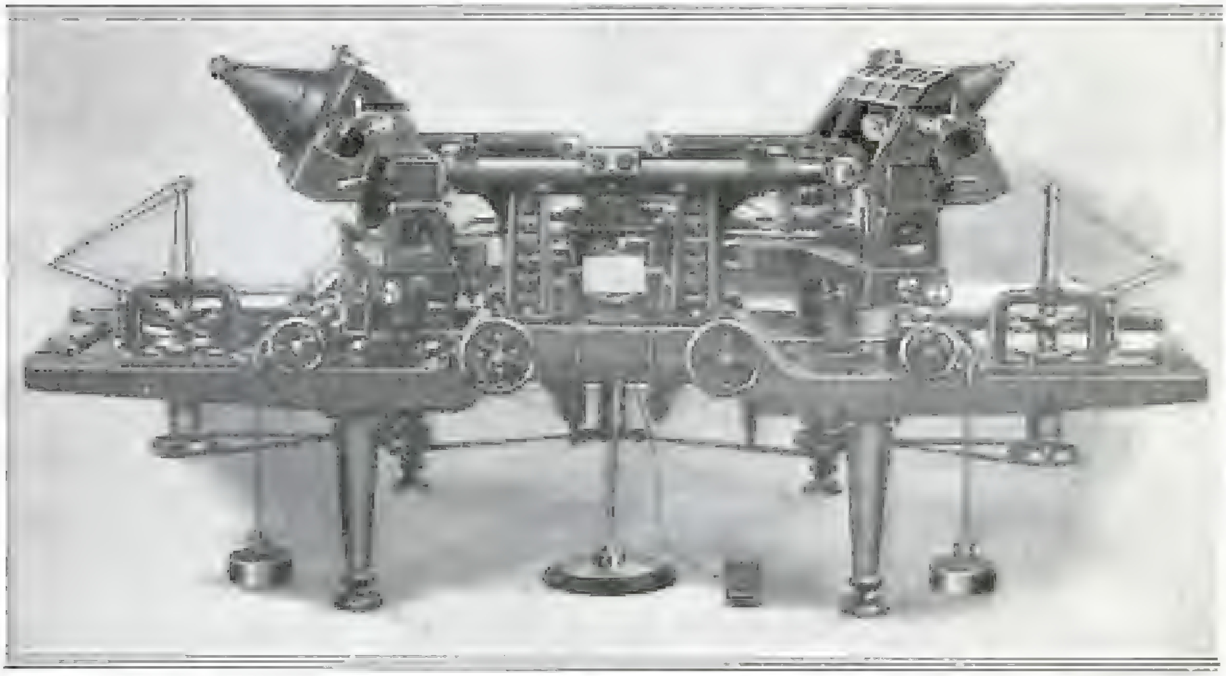
PRECISE MAP SURVEYS BY AERIAL PHOTOGRAPHY

BY CLEVELAND GAINES

BATTLE-FRONT conditions during the World War greatly stimulated the development of aerial photography, and focused the attention of map experts upon the possibilities that lay hidden in that infant science. One of the principal advantages of the aerial survey is, of course, the rapidity with which it can be made; but hitherto all known methods have involved errors, which had to be computed and compensated for later. The construction of an accurate map from such data therefore involved considerable time and effort.

Doctor Hugershoff, professor of geodesy at the Forest Academy of Tharandt in Saxony, Germany, is responsible for an ingenious precision apparatus which is said to overcome these difficulties. The new instrument, which is really a huge stereoscope of special design, permits any two aerial photographs of the same region, partly overlapping, to be used automatically and without further calculation, for the mapping of the area in question. Two important auxiliary instruments are used in connection with the device, and are responsible for its special claims to merit. The first of these is a computing theodolite, which mechanically records the point of reference as well as the various inclinations of the plate from the horizontal when an inclined photograph is taken. The second accessory, equally im-

Aerial Photograph of the Town of Elterlein in Saxony and Its Environs: The Dotted Line Marks the Section Chosen for Enlargement in the Laboratory



General View of Ingenious Apparatus Designed to Make Aerial Photography a More Accurate Science: The Machine Is 10 Feet Long, 8 Feet Wide, and 4½ Feet High, Roughly. It Allows Two Overlapping Photographs to be Used Automatically for Mapping

Copyrighted material

portant, is a drawing mechanism which enables the operator to trace on a sheet of paper, automatically and with accuracy, any topographic features passed over by a movable gauge mark, which is viewed through the eyepiece. Suitable control wheels enable the operator to regulate the gauge mark as he pleases, and a special scale allows the altitude of any traced point to be read immediately. Actual experience has shown that the average error of points ascertained in this manner at a height of 1 mile does not exceed 4 feet, either in a horizontal or vertical direction; and such a degree of accuracy is sufficient for topographic purposes.

ENGLISH RAILLESS CAR HAS SIX WHEELS

Six-Wheel Construction Is the Feature of This New "Trackless Trolley" in Use in England: Better Distribution of Weight Is Claimed for It, and a Saving in Tires and Upkeep has Resulted

For the purpose of obtaining a more equal distribution of the weight, the company operating the railless trolley cars in Bradford, Eng., has redesigned its rolling stock so that each car is now equipped with six wheels. The two rear wheels support half the load, while the four front ones, all of which respond to the steering mechanism, bear the remainder. The load of the motor and front of the transmission is thus spread over eight tires. The front wheels are connected with a central steering column.

METAL CABINET FOR SHAKING OUT DUST MOPS

A portable metal cabinet in which the dirt accumulated on a dust mop may be shaken out, is now being sold. The cabinet stands about 2 feet high and 1 foot square. On one side is a hanging door, in the middle of which is a slit, closed by two rubber projections. After the mop has been placed in the cabinet, these projections cling to the pole and prevent the dust from escaping back into the room. The cabinet also has—for those who use a vacuum cleaner—another door on top, through which the dust bag may be emptied. At the bottom is a removable drawer for disposing of the contents. The "receiver" here described is carried by a handle at the top; another slightly larger model, intended for hotels, is equipped with small rubber wheels. Both are constructed of a light, strong metal and are easily portable.

Left: Method of Inserting Mop into the New Receptacle. Right: Cabinet, Mounted on Wheels, for Use in Hotels

Copyrighted material

1928 J. Cecil Alter 1103 Boston Bldg Salt Lake City, Utah

Section of the Oregon Trail, 40 Miles West of Independence Rock, Utah, Showing Ruts Cut in the Sandstone by the Traffic of the Pioneers

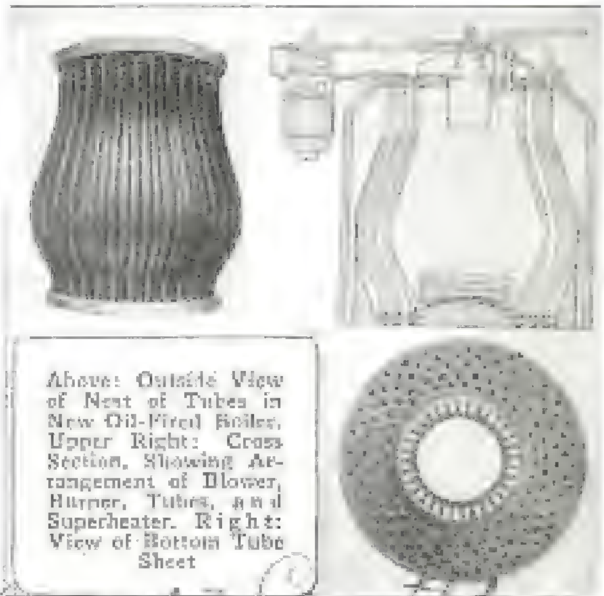
1928

WHEEL-RUTTED ROCKS RECALL DAYS OF OVERLAND TRAIL

In certain sections of the West, deep ruts channeled in the rocky roadway bear mute evidence of the streams of immigrants who, 60 and 75 years ago, slowly toiled their way across the plains and through the mountain passes to the golden land beyond. With a distinctness slightly marred by the weathering of time, these grooves show the action of hundreds of iron-shod hoofs and of the wheels of heavily laden prairie schooners. One of the most marked is about 40 miles west of Independence Rock in Utah, not far from the crossing of the Pacific trails and the continental divide. 1854

NEW BOILER DESIGNED FOR LIQUID FUEL

A new water-tube boiler, designed with regard to the characteristics of liquid fuel, which sometimes gives poor results because it is applied to boilers designed for solid fuel, has appeared recently in England. It consists of a number of vertical, bent tubes nested together somewhat in the shape of a lantern globe, with the ends welded into two annular drums. The burner with its ignition device is located above a central opening in the upper drum, and air from a motor-driven blower is introduced at the same point. The jet of fuel being ignited, the blower forces it toward the bottom of the boiler where, after contact with a steam-superheating coil, the burned gases are directed upward among the tubes by a deflector around the outside.



Above: Outside View of Nest of Tubes in New Oil-Fired Boiler. Upper Right: Cross Section, Showing Arrangement of Blower, Burner, Tubes, and Superheater. Right: View of Bottom Tube Sheet

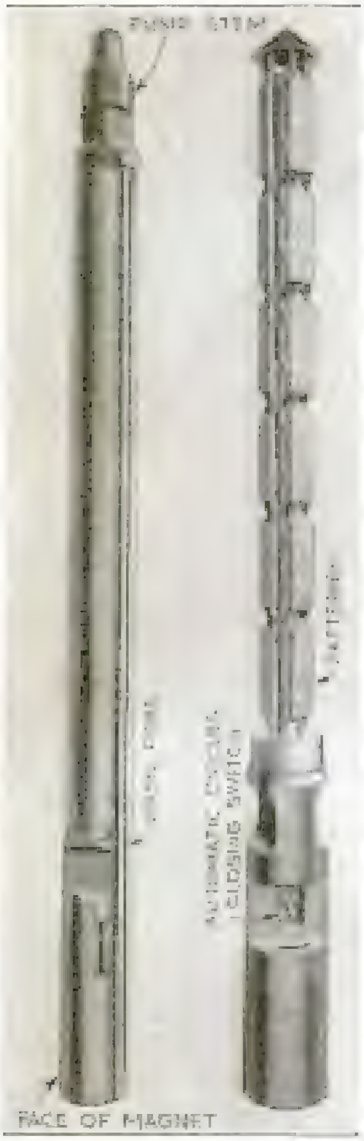
J. H. Sutherland & Co. Ltd Wellington Road, Orton, Birmingham

Copyrighted image

W H Jeffery The Deep Well Engineering Co
506 Produce Exchange Bldg
Toledo Ohio

OIL-WELL MAGNET RECOVERS LOST EQUIPMENT

A new feature of construction has been incorporated in a recently developed magnetic fishing tool, commonly used in oil-well operations to recover lost drills and other equipment. Unlike other devices, the new tool supplies its own electrical current for the magnets, doing away with troublesome wires. Six batteries are used, mounted one above the other over the magnet, and inclosed in a heavy protective casing. An automatic circuit-closing switch operates the magnet only when the tool touches the object being searched for. To prevent mud or other foreign matter in the bottom of the well from interfering with the working of the magnet, a small pump within the device forces water around the face of the magnet and the object being fished for, thoroughly cleaning both, so that an effective magnetic contact is obtained. The lifting capacity of the instrument is stated to be about 4,000 pounds.



SLEEPING-CAR LEAKAGE MAKES PERFECT VENTILATION

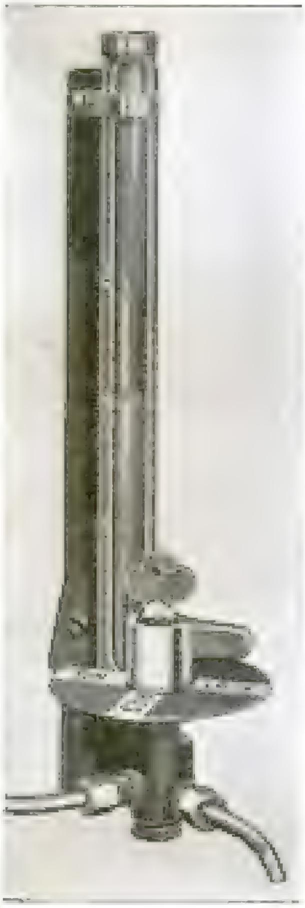
Years of experimental work, and the making of 5,000 tests, all bearing upon the problem of properly ventilating sleeping cars, have finally brought reward in the development of almost startling, yet scientifically correct conclusions. It has now been determined that large openings are not necessary to secure an adequate fresh-air supply, the unavoidable leakage inward, caused by the car's motion, being sufficient to furnish all the air necessary. To stimulate the inward leakage, however, it has been found that exhaust ventilators, in the top of the car, are necessary to suck the dead air out, thereby improving the circulation. This simple means, scientifically determined to be adequate under actual service conditions, has the further advantage that the small incoming eddies take on irregular motions, that cause slight air movements which, however slight, are essential to proper circulation.

Pullman News

AUTO GASOLINE GAUGE HOLDS RESERVE SUPPLY

1923

A combination gasoline gauge, lock, and signal of simple design which reserves one gallon in the tank after a warning has been signaled the driver, has been placed on the market. When in the "on" position, gasoline flows freely through the gauge to the carburetor. In the "lock" position the supply is cut off. When the supply is low, the gauge cuts off the gasoline from the carburetor until the driver has turned the gauge key to the "reserve" position. In this way the device acts as a signal that the gasoline supply needs replenishing and yet prevents absolute draining of the fuel tank.



Auto Equip Mfg Co of Rochester N.Y.

¶Scientists in Great Britain are developing a special thermometer to be used by fishermen in search of hake, a fish said to regulate its movements according to the temperature of the water. The thermometer is trailed behind the fishing boat.

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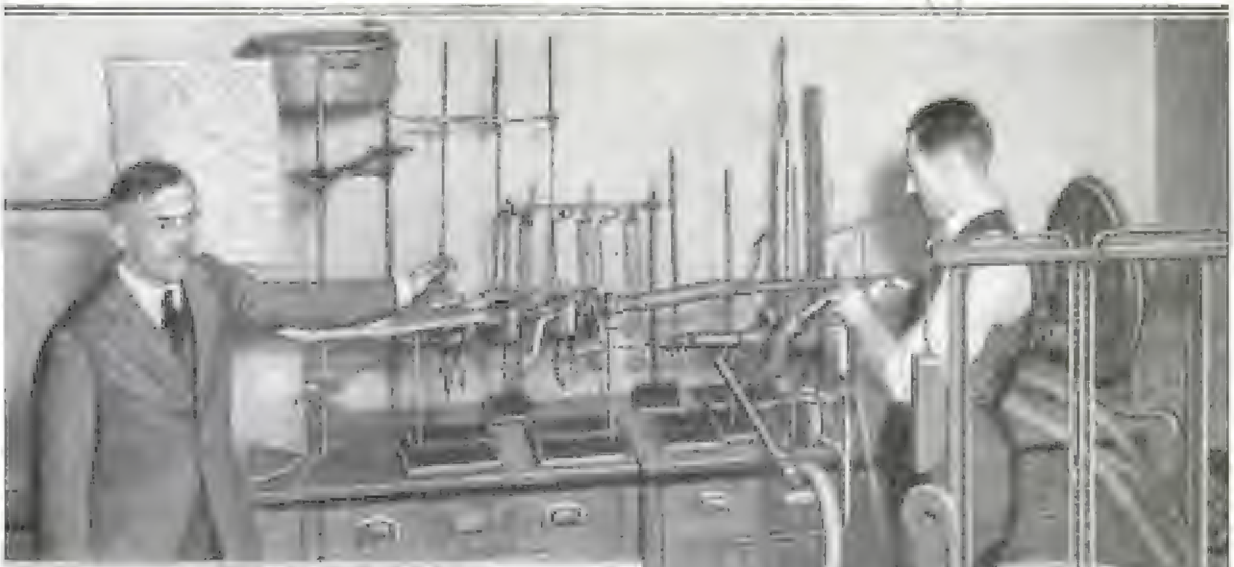
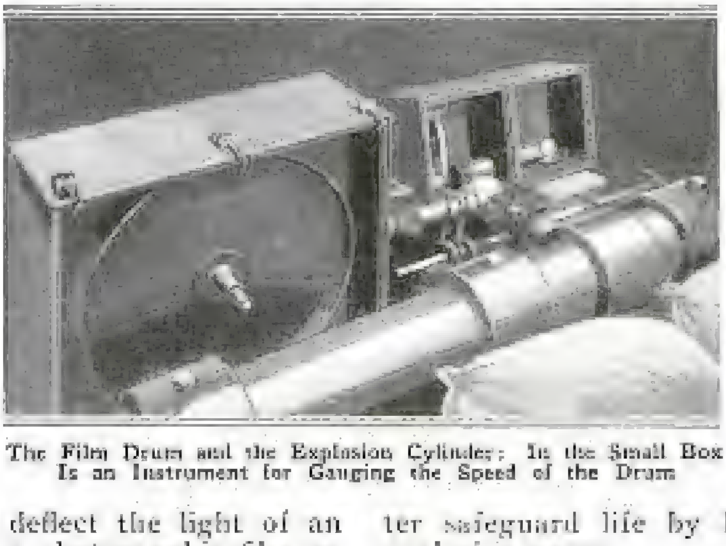
1922 Underwriters' Laboratory Inc
207 E. Ohio St. Chicago

SUPERCAMERA GAUGES SPEED OF EXPLOSIONS



Apparatus for Preparing the Explosive Mixtures: The Pipe Leads to the Explosive Chamber Downstairs

Measuring the speed with which an explosion of gas is propagated—in certain instances, such as an oxygen-hydrogen mixture, as high as 10,000 feet a second—has been made possible through a new apparatus developed at the Underwriters' Laboratories in Chicago. This device, a supercamera, consists of an explosion chamber, 4 inches in diameter and 10 feet long, in one side of which, near the ends, are slits covered with a quartzite lens. In front of these slits are attached small periscopes which deflect the light of an explosion against a photographic film on the outside face of a revolving drum. After preparation of the explosive mixture, it is piped to the explosive chamber. A spark plug explodes the charge at one end of the chamber. The flash is thus photographed on the film at the beginning of the explosion and again when it has traveled to the other end of the chamber. With the peripheral speed of the drum known, and the distance between the two images on the film ascertained, it is possible to determine how long it took the flash to travel the 10-foot length of the chamber, and from that figure compute the speed per second of the explosions.



The Film Drum and the Explosion Cylinder; In the Small Box Is an Instrument for Gauging the Speed of the Drum

It will, of course, be necessary to so gauge the speed of the drum carrying the film, that it will not complete a full revolution while the explosion spreads from one end to the other of the test chamber. The device was made in an attempt to better safeguard life by learning more of explosive gases.

STEAM-FLOW RECORDER FOR SMALL PLANTS

The importance of economy in small steam plants has prompted one enterprising manufacturer to develop a steam-flow recorder which indicates and records exactly how much steam is flowing from the boiler at any given time. This instrument can be easily attached to a range of boilers, and the cost of installation is quite moderate.

Copyrighted material

Keystone View Co. New York City Science 4/10/23

1991

FLOATING ICE IN THE MOVIES MAY BE ONLY PARAFFIN

All is not ice that glistens. Paraffin, for example, when spread over water, and photographed with a movie camera looks as much like ice as that substance itself. Hence its popularity with motion-picture companies when taking scenes that call for floating ice.

COPYRIGHT, KEYSTONE VIEW CO.

Motion-Picture Company's Employe, Spreading Hot Melted Paraffin on a Stretch of Water Which, When Photographed, will Appear Strewn with Ice

MACHINE TIES WIRE-STRAP ENDS QUICKLY

1992

An easily handled wire-strapping machine has just been placed on the market which simplifies the labor of tying the ends of wire straps quickly and efficiently. After enveloping the case to be strapped, one end of the wire is fed into the device, the other end, leading to the wire drum, being also gripped in the machine before cutting. Reversal of a lever automatically tightens the wire, twisting the ends and cutting them after they have become wrapped about each other. All moving parts of the machine then return automatically to their original positions.

The Ti-It Machines Co 5832 S. Green. Chicago

SLEEPING FLOWERS GIVE CLEW TO NEW ANESTHETIC

2093

Florists' complaints that carnations curled up their petals and "went to sleep" when placed in some greenhouses, led to the discovery of a new anesthetic. Investigating the drowsiness of the flowers, it was discovered that it was caused by leaky fixtures permitting illuminating gas, which contains 4 per cent of ethylene, to escape. The ethylene caused the open flowers to close.

It was only recently, however, that Dr. A. B. Luckhardt and J. B. Carter tested the effects of this gas as an anesthetic at the University of Chicago, finding that it renders human beings and animals unconscious pleasantly and causes no bad after effects of any kind so far as can be determined. Recovery is said to be rapid even after long administration.

1993

LICENSE-PLATE CARRIER FITS VARIOUS SIZES

There is on the market a simple carrier that is adjustable to fit automobile-license plates of different sizes, and which requires no rivets, bolts, or screws for fastening the plate in place. It consists of two pieces of thin metal bent to receive the long edges of the plate, connected with two pairs of links and a coil spring that prevent the plate from slipping out.

no info on available

Above: Arrangement of Adjustable License-Plate Holder. Below: Holder with License Plate in Place

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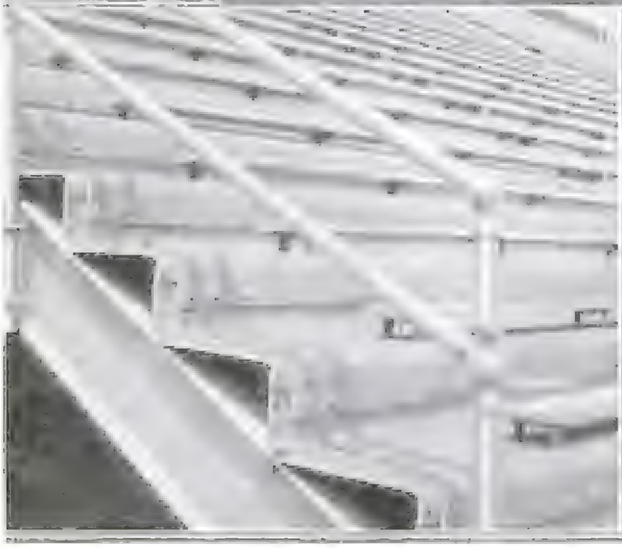
1645

IOWA GRANDSTAND OF STEEL ASSURES PERMANENCE

The authorities at the University of Iowa had permanence as one of their objectives in building the grandstand for their athletic field, and with this in mind determined on a steel structure. The seats are built of long plates bent along their edges so as to form a large Z-shaped cross section. The central part of the "Z" forms the tread of the seat plate and is about 2 feet in width, while the shorter portions of two adjacent plates form the riser. The plates are riveted together at about the center of the latter, with the upper section overlapping the lower, so that the structure is practically waterproof. The plank seats are bolted to brackets attached to the seat plates by stud bolts. The sections now in place will accommodate 9,500 spectators.



In the Upper Photograph is Given a General View of the University of Iowa's New Grandstand Which is Built of Steel, and Which, Accordingly, should Endure for Many Years. The Picture to the Left Shows How the Plates were Overlapped and the Seats Attached. Right: The Steel Supports under the Stand

1929

STUDENTS' HANDSAW HAS TWELVE SETS OF TEETH

Unusual means for bringing home to manual-training students and carpenter apprentices the proper index of a saw's qualities has been adopted by a large manufacturer of saws and other carpenters' tools. Shop instructors are loaned a demonstration handsaw of standard finish, but made with six varieties of teeth, each variety illustrating, with two sets, correct and incorrect tooth filing, setting, and beveling, as well as defects in the blade caused by poor "smithing." Rip teeth and crosscut teeth are shown on this saw.

This Demonstration Handsaw Illustrates the Right and the Wrong Way of Filing, Setting, and Beveling Saw Teeth. It is Used for the Instruction of Manual-Training Students and Carpenter Apprentices

E. C. Atkins & Co. Indianapolis, Ind.
402 S. Illinois

1960

PARISIAN STREET LAMPS HAVE BUILT-IN MAIL BOXES

COPYRIGHT, UNDERWOOD & UNDERWOOD

The municipal authorities in Paris have taken official notice of the fact that visitors there find it difficult to post a letter, on account of the obscure location of the mail boxes. These were frequently located in doorways and tobacco shops, where their presence was unsuspected by the stranger. A new type now adopted, of which 3,000 have been placed in service, is built into the base of a street lamp, so that even a visitor knows where to mail his letters.

2032

"PLANT TREES" AS CIVIC-EMBLEM PLAN IN NEBRASKA CITY

A seal picturing a magnificent maple with the inscription above it, "Nebraska City, Nebraska, the Town That Gave the World a Great Idea," and at the bottom, "Plant Trees," is to be carried on the business stationery of the commercial and professional men of that city, if the plans of those sponsoring the idea are realized.

The motto, "Plant Trees," originated with the late J. Sterling Morton, of Nebraska City, who was also responsible for the movement resulting in the legalization of Arbor Day in that state. Following this lead, nearly every state in the Union has set aside an Arbor Day, at which time school children and others plant trees. Ned C. Abbott, who suggested that the seal be adopted, writes that a short item in this magazine describing the slogan and seal adopted by the merchants of Walla Walla, Wash., "The Valley They Liked So Well They Named It Twice," inspired him to create the device.

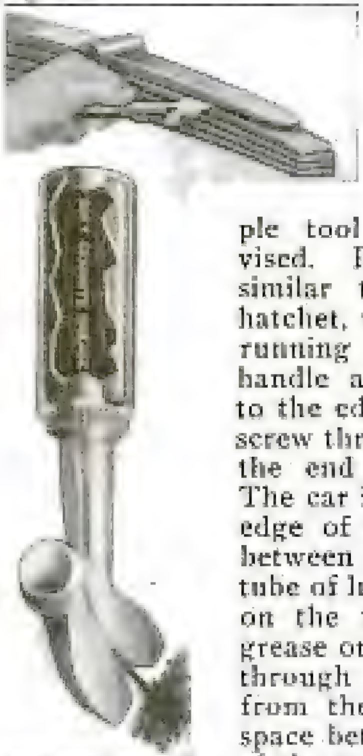
2107

ITALY'S TELEPHONE SYSTEMS AGAIN IN PRIVATE HANDS

The telephone systems of Italy, lately owned by and under the supervision of the Italian government, will be turned over to private industry for operation, it is announced. The state will retain ownership for the time being, however, granting only the right to operate, with a percentage tax of the profits as requisite clauses of the agreements. The concessions, with a minimum of 25 years, may possibly terminate in complete private ownership.

1802

SPRING LUBRICATING TOOL IS HATCHET-SHAPED



For injecting lubricant between the leaves of automobile springs, a new and simple tool has been devised. In shape it is similar to an ordinary hatchet, with an opening running through the handle and head, down to the edge. An outside screw thread runs around the end of the handle. The car is jacked up, the edge of the tool driven between the leaves, a tube of lubricant screwed on the thread, and the grease or graphite forced through the opening from the tube, into the space between the leaves of the spring.

¶Called upon to pay fees for the privilege of broadcasting dance music, and other copyrighted popular pieces, privately owned radio-broadcasting stations in Chicago have decided to omit music of that description from their programs.

1170 9

FOREST DISEASE FOUGHT BY AIR, LAND, AND WATER

BY FRANCIS DICKIE Heriot Bay B.C. Canada

THE most important scientific battle in many years in the field of plant diseases has been waged within the last year on the Pacific coast of the United States and Canada, a battle in which the stake is standing white-pine timber valued at $300,000,000, menaced by the destructive blister rust.

The pest, which formerly was found only in the eastern portion of North America, was discovered in the fall of 1921 on some black-currant leaves from Vancouver, and a search revealed the disease as present over a considerable area. Immediately the two governments took concerted action to check and stamp out the blight. Timber experts, forest rangers, and many civilians were enlisted in the service of scouring a wooded area of 4,000 square miles, and a well-equipped air force, which already was established at Jericho Beach, Vancouver, with three modern seaplanes, was called upon to lend assistance in carrying on the fight. In spite of a season of unusually severe forest fires, the work was effectively carried on until snowfall, and in five months a task was performed that would ordinarily have taken several years.

BY COURTESY OF A. T. DAVIDSON, CHIEF, DOMINION PINE BLISTER SURVEY

White Pine Girdled with the Rust Blight, and Dying

The disease is a fungous growth commonly known as white-pine blister rust, or black-currant rust, and in the past has been largely confined to currant and gooseberry bushes, where it has not been sufficiently virulent to attract much attention, although it has undoubtedly in many instances been responsible for the difference between a profitable and an unprofitable crop. On pine trees the disease spreads from year to year in the infected tissues, finally girdling and killing the affected part. Large trees as a rule resist the pest longer than small or young trees, but in cases where the infection is quite extensive or the growth very active, both succumb as easily. Seedlings in particular are liable to fall a quick prey to the disease, which is quite serious in view of the widespread attempts at reforestation.

Seaplane Used in the Campaign against Blister Rust That Infests the Forests of the Pacific Coast Regions of the United States and Canada

While there is some difference of opinion as to the damage done to mature trees, according to some reports trees 2 feet in diameter are killed by this blight. The disease which is a native of Europe, and evidently originated in the Baltic provinces of Russia, has been known in the latter locality since 1865. It gradually spread to Switzerland, France, and Great Britain, and finally invaded the North American continent.

Copyrighted material

1960

Panorama Showing Length of New Pier at Vancouver: Beginning at the Left can be Seen the Derricks for The Precast Sections are Loaded on Scows and Conveyed along the Pier as Needed. After having

LARGE PIER AT VANCOUVER NEARING COMPLETION

BY HENRY C. COPELAND, 1401 Dominion Bldg. Vancouver, B.C. Canada

THE Ballantyne Pier, now under construction at Vancouver, B. C., will be completed and placed in service about August 1, this year. It is said to be the largest pier of its type on the Pacific coast, and one of the two or three largest of the kind on the continent.

Derrick at Left Forcing Down Cylinder: In Foreground, Tops of Two Cylinders in Place, and Trusses

Dredging for the foundation began in August, 1920, and construction work in May, 1921. The estimated cost will be 5,000,000 dollars.

The pier will be 1,200 feet in length by 341 feet in width, and will be used for general freight purposes. Rail service will be given by two tracks on each apron at the sides and three in the center. Warehousing facilities are provided in five two-story reinforced-concrete sheds, of which four are 500 feet by 110 feet, and the fifth 400 feet by 110 feet, in ground area.

Electric cranes will be used for loading and unloading the ships, and electric conveyors will handle the freight in the

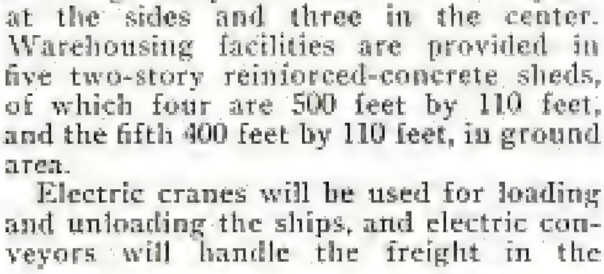


Diagram Showing Cross Section of Warehouse and the Arrangement of Cylinders Used as Supports

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1760

Placing Cylinders, the Warehouses under Construction, and the Decks Where the Concrete Cylinders are Cast. been Set in Place by the Derricks, They are Sunk to Bedrock by Loads of Six-Ton Cast-Iron Rings.

warehouses. Grain galleries are also provided.

The method of constructing the pier is unusual. The structure rests upon 413 hollow concrete cylinders in sections. These are precast, and are 7 feet in outside diameter with 9-inch walls. Notches are cast in the ends of the sections, so that they will "key" together and can be cemented into one solid column as they are sunk into place.

The sections are guided into place and lowered from tall derricks. The dirt is brought out of the cylinders by means of a dredging bucket dropped down the inside. Large cast-iron rings, six tons in weight, are used as a load to force the cylinders down. At times as much as 450 tons of these weights are used on a single column.

In some cases, it has been necessary to sink the cylinders through 85 feet of material to reach bedrock. When the foundation rock is reached, a diver is sent down the inside of the cylinder to clean up the bottom preparatory to cementing the column to the rock. The entire core of the column is then filled with concrete, and the finished result is a pillar of solid stone, 7 feet in diameter, reaching and cemented to the bedrock.

On top of the columns precast trusses of reinforced concrete are placed, and about them is built the form for the concrete deck.

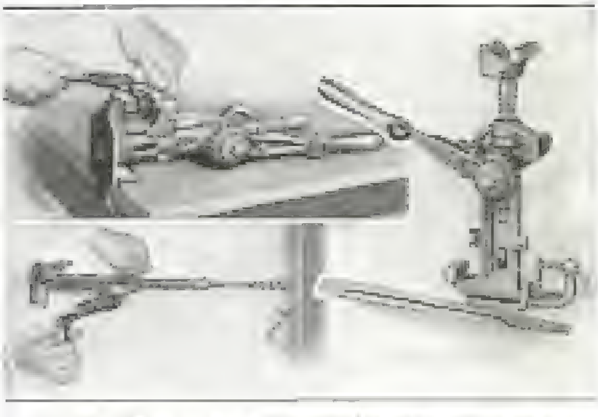
In carrying on this work, the cylinder sections and trusses were all cast at North Vancouver, across Burrard Inlet, where there was plenty of room for assembling material and storing the cast parts for curing, whereupon they were conveyed to the site of the pier on scows as needed.

Considered from the standpoints of permanency and cost of maintenance, this type of wharf structure is far superior to the creosoted-piling structure.

863

FOUR-IN-ONE TOOL MAKES HANDY COMBINATION

Four commonly needed tools—jack, vise, breast drill, and screwdriver—in one are offered on the market in the form of a single combination tool. The ratchet driver which works the jack also serves to actuate the drill or screwdriver when it is fixed in a socket placed in the end of the shaft.

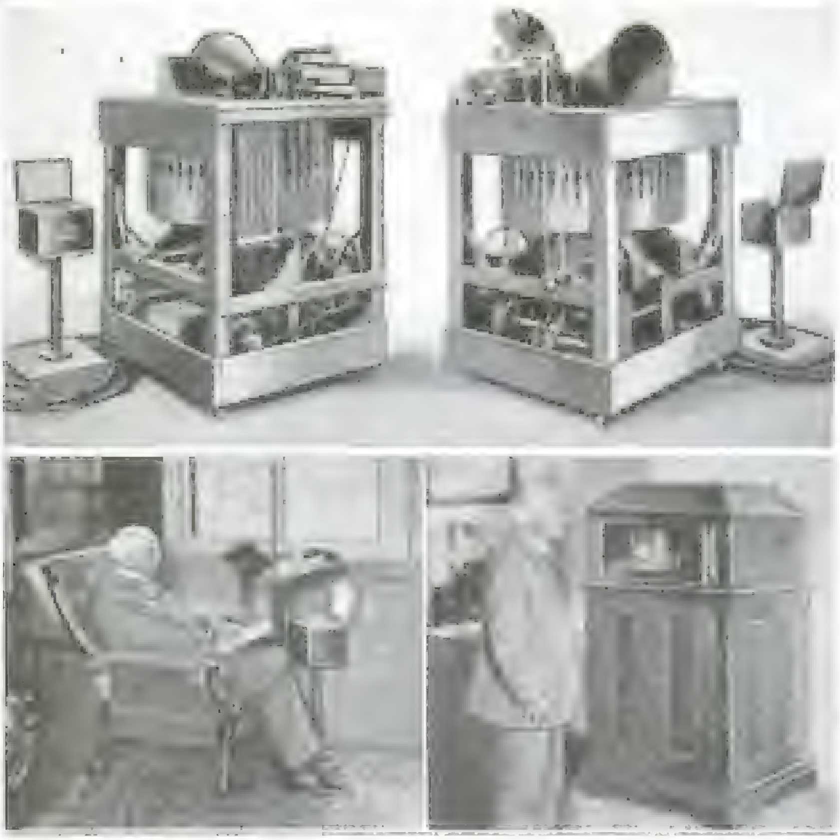


Left: The Combination Tool When Used as a Breast Drill. Above: As a Vise. Right: As a Jack

The Utility Tool Corp.
Transportation Bldg.

PHONOGRAPH WITH KEYBOARD PICKS OUT RECORDS

As an innovation in the construction of phonographs, an inventor has built a machine that, upon the pressing of any certain two keys, picks out the desired record, places it in position on the turntable, swings in the tonearm, and lowers the needle into position, thereupon starting the playing mechanism. When the record is played through, the mechanism automatically gets into action again, swinging the playing arm back, stopping the turntable, picking up the record, and returning it to its place in the magazine, which holds 50 records. The pressed-down buttons lock themselves and the remainder of the keys in position, thus preventing tampering with and injury to the mechanism while the record is being played. Fifteen keys control the machine. These may be built on a portable board so as to be carried about the house, an electric cable connecting it with the phonograph.



Above: Two Views, Showing Mechanism of Phonograph That Picks Out Its Own Records. Lower Left: Portable Keyboard Mounted on Pedestal. Lower Right: Listening to the Music

RECORD FOR HAULING SPRUCE CLAIMED IN MAINE

Rivalry among the crews in the Maine woods, as to which could haul the biggest load of "pulp," as the peeled spruce for paper making is called, resulted recently in a crew at Venture Brook, Washington County, piling and hauling a sled with a total load of over 12 cords. This is considered quite unusual for haulage of this kind. The sled was 32 feet long, or the length of four cords, and the supporting stakes were 12 feet high. In spite of the heavy load, only the regular two-horse team was needed to pull it.

The Enormous Load of More than 12 Cords Piled and Hauled by a Crew Working at Venture Brook, Washington County, Maine

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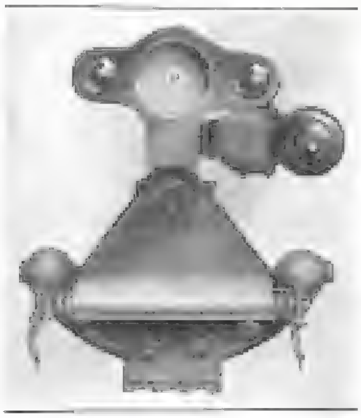
OLYMPIC GAMES' 1932 SESSION AWARDED TO LOS ANGELES

The Olympic Games will be held at Los Angeles in 1932. This announcement was made at the international Olympic committee's recent meeting in Rome to discuss plans for the games in Paris next year. It was decided that Amsterdam, Holland, would be selected for the meet in 1928, because disturbed economic conditions might prevent European competitors from financing a trip to the United States at that time, but that America should have the next available date. The award terminates a vigorous campaign by athletic authorities throughout the country, and by Los Angeles, which in building a new large stadium expressed the hope that the award would be made to that city. This will be the second time the games will be held in America, the first being in 1904, at St. Louis.

SIGNAL INSTRUMENT CHARTS WATER-LEVEL RECORD

A constant check on the water level in steam boilers is the object of a new recording device recently placed on the market. The instrument makes a written record of the height of the water in the boiler throughout the 24 hours, and in addition rings a bell whenever the level is either too high or too low. A mechanically operated pen draws a red-ink line on a circular, clock-driven chart, and this record indicates graphically all the important facts which need to be known regarding the care the boiler is receiving. The red line also shows the exact time when the boiler was "cut in" and "cut out," when it was banked for the night, when it was "blown off," and when in operation. Foam in the boiler actuates the bell signal in the same way as would low water, and the ringing will continue until this undesirable condition is corrected. The water gauge is illuminated sufficiently to make its markings visible 50 feet away.



CONCRETE OFFICE BUILDING COMPLETED IN DALLAS

One of the world's tallest concrete office buildings, a 21-story structure known as

How the 21-Story Concrete Office Building in Dallas, Texas, Appears from a Neighboring Structure

the Medical Arts Building, has been completed in Dallas, Tex. Except for the three lower stories, it is in the shape of a cross, thus admitting outside light to all the offices. These are being occupied only by physicians and surgeons. The building might be called a monolith, having been poured in one continuous process. The cost was 1,250,000 dollars.

DESIGN HOSPITAL AIRPLANE FOR SURGICAL WORK

A hospital airplane, the first of its particular type in this country, will soon be built at McCook Field, Dayton, Ohio, it was recently announced. It will embody a special design, distinguishing it from ambulance planes now in use, and provides a compartment in which a surgeon can administer to two patients lying on comfortable cots while the plane is in flight. The capacity will be a pilot, a surgeon, and two patients, or, if some less essential parts of the equipment are left out, four persons in addition to the pilot can be carried.

U. S. Bureau of Public Roads
new Post Office Bldg
Portland Oregon

1907

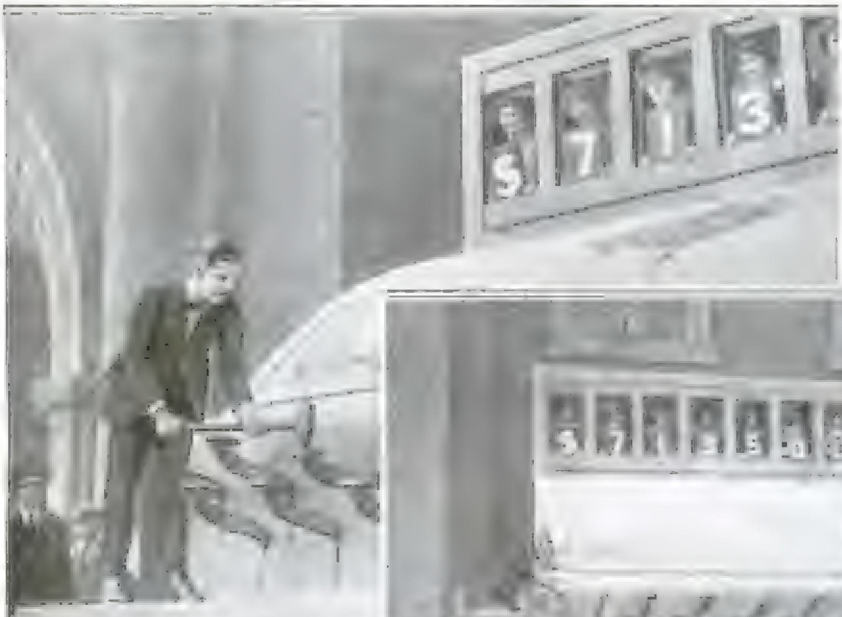
HUNDREDS OF SNAKES KILLED BY ROAD CREW

A Few of the Hundreds of Rattlesnakes Killed by a Road-Construction Crew Working between Yakima and Ellensburg, Washington: Many of the Reptiles Were More than Four Feet in Length

A road-construction crew working in central Washington has been killing hundreds of rattlesnakes daily. The road on which the snakes have been found in such numbers is being built from Yakima to Ellensburg by the United States Bureau of Public Roads. Recently a single blast killed 123 of the reptiles, 41 of which were more than 4 feet in length, some with as many as 15 rattles. The crew gathered a few dozen of the snakes, after a blast, and strung them from a rope "for exhibition purposes."

1849

GIANT "CASH REGISTER" AIDS UNIVERSITY CAMPAIGN



"Ringing Up" the Giant Imitation Cash Register at the University of Southern California

As Contributions to the School Fund were Reported, the Leader "Registered" the Amounts by Striking the Proper Keys

Los Angeles, Calif.

A giant "cash register" constructed of wood was recently used as a publicity stunt by students of the University of Southern California in conducting a drive for school funds. Placed at a conspicuous point on the campus, the register was the rallying place of student-workers who met to report their progress. As the amounts were called, a campaign leader "rang them up" by striking the proper keys with a sledge hammer. Girl students, standing behind the appliance, slipped into place placards bearing the appropriate figures.

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2013 The Standard Industrial engineering Corporation
Alameda County Calif.

A Glance at This View of the Altamont Pass Viaduct, on the Stockton Highway, California, Brings Home at Once the Dangerous Nature of the Crossing before the Completion of the Structure

2013

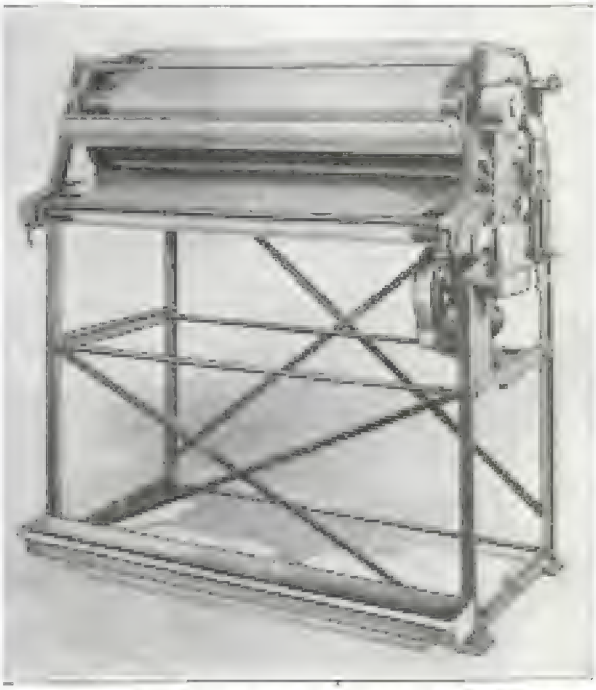
CONCRETE VIADUCT MAKES ALTAMONT PASS SAFE

The completion of the Altamont Pass viaduct on the Stockton Highway in California eliminates one of the most dangerous crossings as well as one of the worst stretches of road in the state. The structure is of concrete, built on what is known as a reverse curve, that is, like the letter "S," with its curves drawn out and flattened. It is 35 feet high, with the outer edges of its curved roadway elevated on the bends to assure safe travel. Foundations for the piers had to be carried down to bedrock, which was found 35 feet below the surface. The importance of this link may be gauged from the fact that more than 3,000 vehicles have occasion to use the crossing each day.

2022

BLUEPRINT DRIER FEATURES COPPER CYLINDER

Embodying a number of features of merit, a new machine for drying blueprints has been placed on the market. In operation, the wet prints are drawn around a heated cylinder by means of an endless canvas belt and delivered dry and free from wrinkles in a receiving tray within easy reach of the operator. One feature is the use of a copper cylinder, which heats quickly and to which the prints will not stick. A thermostatic control for use when gas is the heating agent, and a set of switches for electrical heating, are provided. Special emphasis is placed on an ingenious arrangement whereby the canvas belt may be easily centered; an asbestos apron which may be run through the machine to protect the canvas belt from rotting when not



Blueprint-Drying Machine in Operation: The Copper Cylinder is Contained within Upper Part of Machine

in use, and cut gears and ball bearings in the driving mechanism. Eight to nine feet of prints may be run through the machine per minute.

The C. F. Pease Co., 813 N Franklin Chicago

Copyrighted material

2042 The Hercules Mfg Co
711 Cherry St
Chattanooga Tenn

An Acetylene Egg-Candling Machine, Claimed to Furnish a More Satisfactory Means of Grading Eggs than the Electrical Candler

EGG-CANDLING MACHINE USES ACETYLENE GAS

An improvement over the electric type of egg candler is claimed for a new machine which employs acetylene gas as a source of illumination. By this means the machine makes a blood streak in the egg show red, instead of merely dark, as in the electric candler, thereby furnishing a more reliable means of grading the eggs. A small gas generator furnishes the light, and is connected to the candler by means of flexible hose. The device is hooded, and its interior painted a dull black, to minimize reflection.

2041

The Marine Journal 3/24/23

WELL-KNOWN SKIPPER GIVEN "LEVIATHAN" COMMAND

CAPTAIN HERBERT HARTLEY, recently given command by the United States Lines of the largest American ocean liner, the "Leviathan," and the second largest ship in the world, attained his post by reason of typical Yankee pluck and merit. He is, as well, the oldest in point of continuous service and the only American-born captain in the service of the American Line. He was born at Oswego Falls, N. Y., in 1875, and, after his years of training joined the "St. Louis," at that time (1896) one of the fastest and largest of transatlantic liners. For 21 years he was shifted from ship to ship, always advancing, until, in 1917, he returned to the "St. Louis" as its captain. As skipper of the "St. Louis" he ran the German blockade in March, 1917, the vessel being the first armed merchantman to reach an English port. Later in the war he was made a lieutenant commander in the Naval Reserve, in recognition of his skill and daring. When, after the war, the "St. Louis" was burned, Captain Hartley was placed in command of the "Mongolia," which position he retained until he took a vacation recently, his appointment to the "Leviathan" following his brief rest.

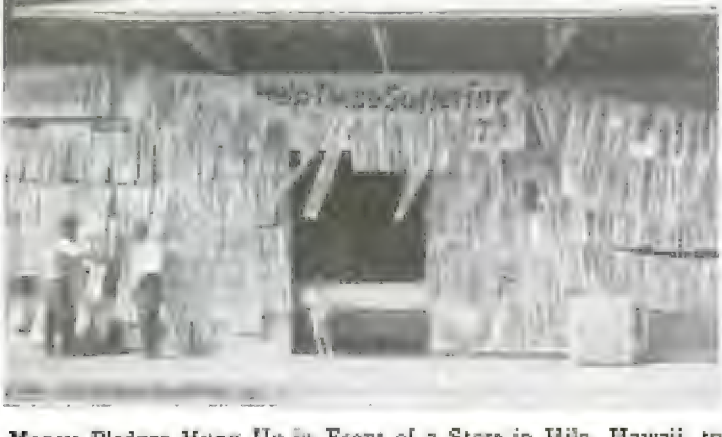
CAPTAIN HERBERT HARTLEY

Commander of the "Leviathan," America's Largest Ocean Liner

1947

NOVEL SUBSCRIPTION APPEALS IN HAWAII

Among the victims of a tidal wave, which recently did much damage to Hilo on the island of Hawaii, were many Japanese and Chinese. When their countrymen set about raising funds for their relief, headquarters were established in one of the stores of the town, and money pledges collected. These, written on long strips of paper, were then hung about the front of the store to serve as an appeal for additional funds.



Money Pledges Hung Up in Front of a Store in Hilo, Hawaii, to Serve as an Appeal for More Subscriptions for the Benefit of Sufferers from a Tidal Wave

Crit. Hogg + Ford, 416 ... League Bldg
Los Angeles, Calif

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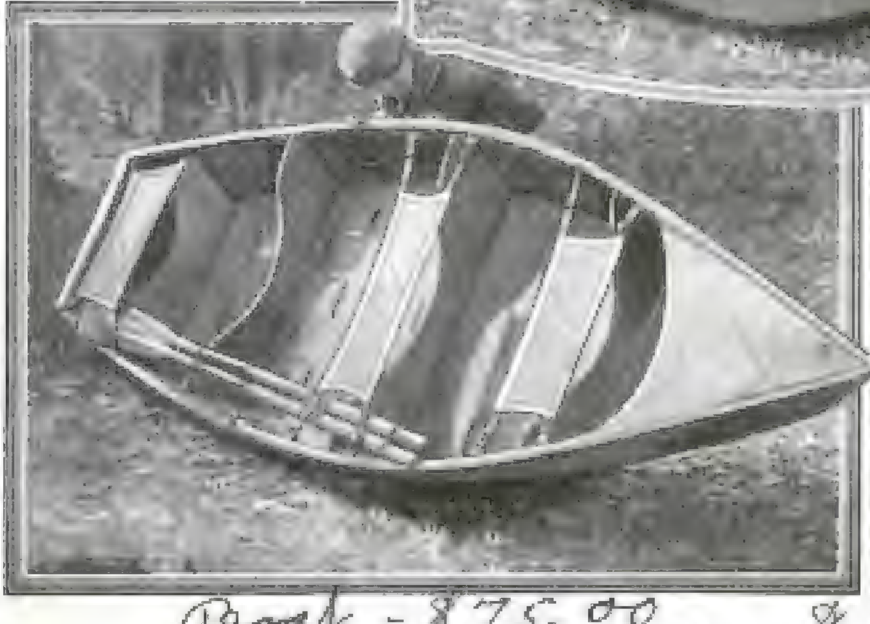
2016 Rarboat Mfg Co.
~~364 W. Madison~~
17 W. Illinois Chicago

KNOCKDOWN ROWBOAT SIMPLE AND COMPACT

As the Result of an Ardent Fisherman's Desire for a Quickly Assembled Knockdown Boat of Light Weight Yet Stanch Seaworthiness, a New All-Wood Boat has Made Its Appearance. The Picture to the Right Shows the Compact Case in Which the Boat may be Packed and Secured to the Running Board of an Automobile. Two Canvas Bags Provided with Strap Handles are Fitted to the Case. Although a 12-Footer, the Boat can be Contained in a 12 by 18-Inch Space

Left: With No Other Tools than the Hands, the 21 Separate Boards are Quickly Meshed Together. No Bolts, Screws, Complicated Fasteners, or Small Loose Parts, to Become Lost or Misplaced, are Used. After the Floor is Put Together, the Sides are Assembled and Attached

Right: Showing the Framework of the Boat Assembled, the Canvas Cover Yet to be Attached; A Padlock in the Bow Prevents Disassembling of the Boat. The Floor is So Constructed That a Weight on the Bottom Binds More Tightly the Metal Fastenings



Left: The Boat Completely Assembled, the Heavy, Strong Army-Duck Canvas Being the Last Addition. The Buckling of the Seats Stretches the Enveloping Material over the Boat Tightly. All Wood Used Is Three-Ply Waterproof Airplane Board, Metal Fasteners being Riveted with Large Brass Rivets. Weighing 100 Pounds, the Boat will Accommodate Three Grown Persons. The Inventor Claims It can be Assembled in from Six to Eight Minutes, will Not Shrink from Heat, nor Leak, and will Last for Years

Boat - $75.00
With accessories - $100.00

Copyrighted Material

Fotograms New York City J. B. Swan, Auburn Nebr.

1986

BUTTER VANITY CASES NOW USED IN GERMAN CITIES

Vanity cases are reported to be used for carrying butter by women restaurant patrons in Berlin and other German cities. The men use metal boxes, made in imitation of a small book, for the same purpose. Few of the restaurants can afford to serve butter as freely as in prewar days, and in those providing it the price is exorbitant.

1725

SPECIAL SLEEVE FEATURES NEW ROLLER BEARING

A new roller bearing which, in common with others of the type, has for its main object the reduction of friction losses suffered in bearings where sliding friction occurs, offers a feature in an accurately ground high-carbon steel sleeve that is clamped to the shaft. Steel collars welded to the sleeve are so drilled and tapped as to render it impossible to put the sleeve on the shaft incorrectly, thus insuring a true bearing surface for the rollers.

Bond Foundry & Machine Co. Manheim, Lancaster Co., Pa.

1877

GULF STREAM PREVENTS MAIL FROM REACHING LIGHTSHIP

Though the ocean was calm, and apparently entirely "as usual," the mail boat calling at the Diamond Shoal lightship, near Cape Hatteras, N. C., recently found the Gulf Stream near the lightship running so strong that it was impossible to row through it. Ordinarily, the stream is some distance from the ship. Before leaving, the captain took the temperature of the stream and found it to be 72° F., while about 100 yards away, outside the stream, it was 16° lower.

1989

COLLAPSIBLE COOKSTOVE FOR CAMP USE

A collapsible cookstove and heater for camp use has been devised, which rightfully lays claim to the merit of great simplicity of construction. It consists of two sections of pipe, mounted vertically, one above and the other below the stove proper, at opposite ends of it. Wood or other fuel can be used in the lower pipe or chamber, the heat passing upward, through the stand, and out through the upper pipe, a damper regulating the draft.

1740

PORTABLE WELDING OUTFIT GENERATES OWN GAS

A new portable oxyacetylene appliance has appeared in the form of a gas generator intended to do away with the use of high-pressure cylinders. It operates automatically without clock or motors, is simple to use, and has the equivalent carbide capacity of a 150-cubic-foot cylinder of gas. It weighs about 200 pounds.

The Marine Journal 2/24/23

The Alexander Milburn Co. 1416 W. Baltimore, Baltimore, Md.

2028 International Newsreel Corp
226 Williams St
New York City

OVER THE TOP—AND DOWN

THE English Grand National Steeplechase, one of the most colorful events in the world of sport, is never without its thrills—and mishaps. Few falls, however, have approached the spectacular more closely than that taken by "Trentino" at the Bechers Brook jump. Both horse and rider hit the turf almost perpendicularly.

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A. J. Pidgeon, Inventor, Thetford Mines,

185

WINTER WHEEL DESIGNED FOR MOTOR VEHICLES

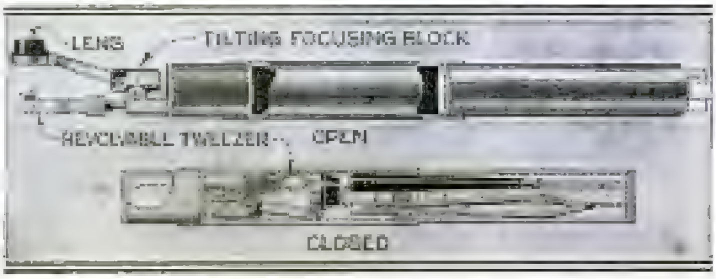
Motor-Driven Sleigh Equipped with Specially Designed Wheels, Which Increases Its Traction with the Load upon It: Each Wheel is Separately Driven through Gears at the Rear

Successful results are reported to have been obtained with a new type of wheel that can be used on a motor-driven sleigh or attached to an ordinary automobile by removing the rear wheels and mudguards. The wheel, which is in the form of a helix with its axis parallel to the ground, worms its way through snow and over ice with a traction that increases with the load in the vehicle. Each wheel is driven by special gears inclosed in a case at the rear.

76

DISSECTING SCOPE IS COMPACT AND EFFICIENT

A simple and efficient dissecting device designed for use in examining small objects found in plant and insect systems, offers a compact instrument that can be folded up and carried in the student's pocket. It consists of a tube-shaped holder which is held in the left hand with the forefinger in position to manipulate the tweezer while the thumb rests on the tiltable focusing block. The right hand is thus free for using the dissecting needle. When not in use the part to which the lens and tweezer are attached, and the tools, can be slid into the hollow tube.



Above: Pocket Dissecting Scope with Tweezer and Lens Extended Ready for Use. Below: Sectional View, Showing Scope and Tools Folded into the Hollow Handle

Inv. Elmer E. Campbell, Lafayette, Ind. Purdue University

1766

WAGON FILLS AND DUMPS ITSELF IN SHORT TIME

A New Type of Dumping Wagon Designed for Scooping Up and Moving Earth and Similar Materials on the Farm: The Handwheel Controls the Depth of the Scoop

For transporting earth or other materials, a self-loading and dumping wagon has been invented. A wide blade in front lifts the earth, and a conveyor carries it upward into the box. Distributing is done by an apron, as in a manure spreader. The moving parts are actuated by traction of the rear wheels, and a wheel regulates the action of the blade. The wagon fills itself in about 50 feet, dumping as desired.

Inv. Robert Shedenhelm, Ladora, Iowa

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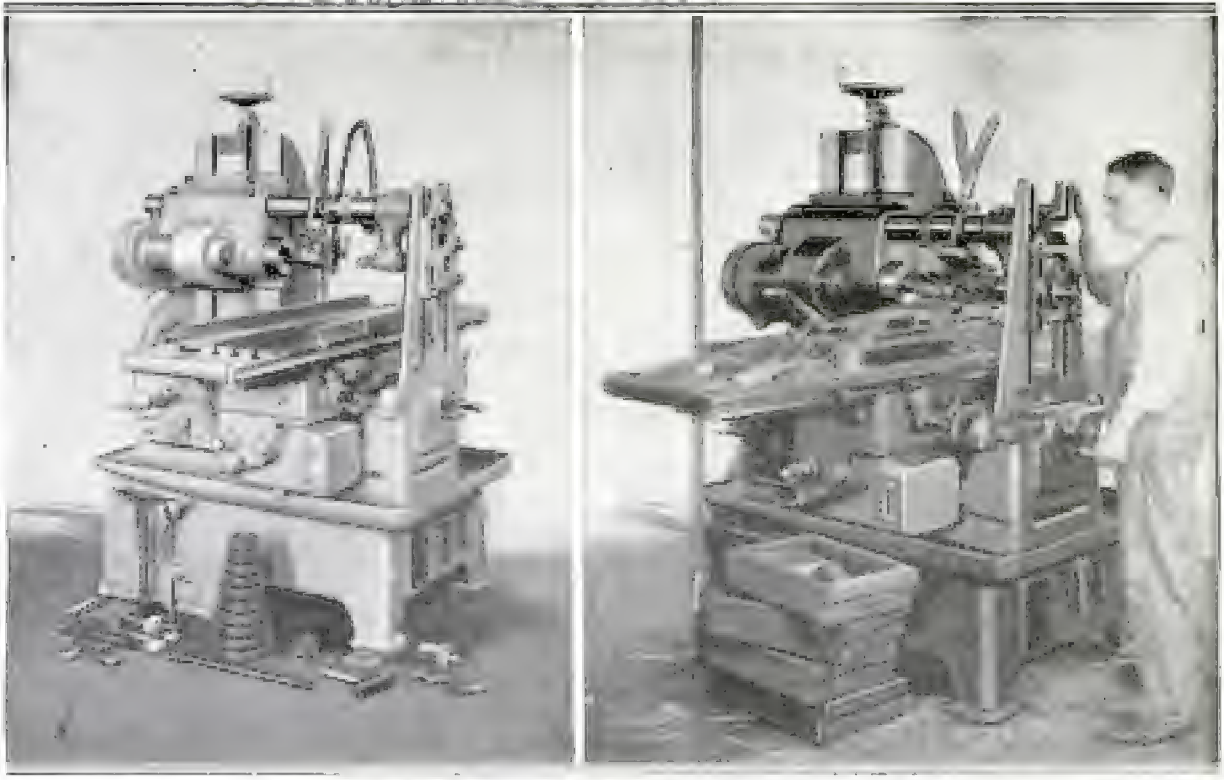
1926 Brown & Sharpe Mfg Co

Providence R.I.



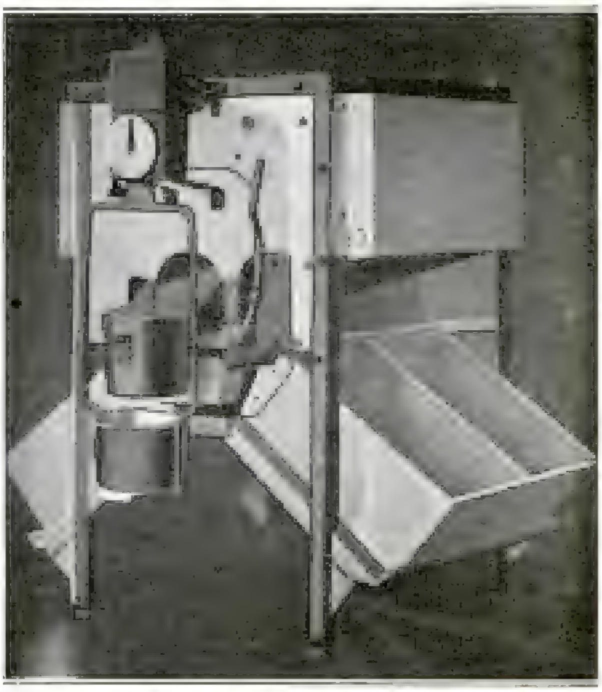
Left: New Automatic Manufacturing-Type Milling Machine, Which Provides for High Production of Duplicate Parts Where the Loading Time Is About Equal to the Cutting Time. Right: Machine in Operation; Note the Chips, Indicating the Heavy Cut That is being Made

AUTOMATIC MILLING MACHINE FOR PRODUCTION WORK

The salient feature of a new milling machine, designed for the production of duplicate parts in large quantities, is the automatic control of the speed and travel of the spindle and table. This is accomplished by means of dogs located at the front and rear of the table. Other dogs provide for automatically working the starting, stopping, and reversing of the spindle. The automatic stopping of the spindle with the table on the return stroke provides against marring the work. By reversing the spindle, two sets of cutters with teeth facing in opposite directions permit a cut to be made in either direction. The table is long enough to permit setting up of work on one end while the cutter is operating. It is arranged for constant-speed drive either from a line shaft or from a motor in the base.

DEVICE HANDLES VEGETABLES MECHANICALLY

An interesting handling and weighing receptacle for vegetables has been placed on the market for the convenience of retail grocers. It is designed to simplify the labor of sacking onions, potatoes, and the like. Ordinarily, the merchant fills the sack at the barrel, then carries it to the scales for weighing. The new device has a capacity of several bushels, and can be set up on the counter. A sack, resting on the scale platform, is placed under the spout, and it is only necessary to work a small lever back and forth, meanwhile keeping an eye on the scales, until the correct weight registers.



A Convenient Vegetable-Handling Receptacle, Which can be Attached to the Grocer's Counter: The Scale Is Adjustable Vertically, for Handling Short or Tall Sacks

Mr. Herbert M. Shilstone (Carbrox)
New Orleans, La.

RICE-FIELD WASTE BENEFITS SUGAR REFINING

1553

From the fibrous rice materials—the hulls, straw, and fibers—which formerly cost money to dispose of, now is being made a product that not only brings a

Discoverer of Method of Utilizing Rice Waste in His Laboratory: The Quantity of Waste on the Paper Is Sufficient to Treat 100 Pounds of Sugar

return to the planters and the mills, but finds a ready use as an economical substitute for boneblack in refining sugar. The fact was discovered by accident when a chemist, who was experimenting with the paper-making qualities of rice waste, left some of it in his drying oven for several days. He found that though the waste had become thoroughly carbonized, it had not shrunk or lost its shape, which indicated it to be a porous material of clarifying properties. He mixed some with molasses and there was no change, but when he boiled it with caustic soda to remove the silica, and then mixed it with molasses, the mixture cleared up at once.

When treated commercially, the fibrous rice waste is put into a retort from which air is excluded, and there exposed to a temperature of 2,000° F. for half an hour. The carbonized material is then transferred to digesters and, with a strong alkali solution, is subjected to a temperature of 235° for two hours. A nearly pure carbon results, which is as porous as a sponge, and so hard that it requires several hours' grinding in a ball mill to reduce it to a powder. Even the dust particles retain a definite shape and their porous nature, which makes the material such an active clarifying and decolorizing agent. As a decolorizer it is mixed with a sugar solution in the proportion of one-half pound to 100 pounds of sugar, heated in a suitable tank, and filtered. The material still possesses considerable coagulating properties and gum-absorbing power, and is used for clarifying impure cane juice.

The use of boneblack in connection with sugar refining involves an expensive outlay for the production of the boneblack and for treating the sugar. It is said that with the new material a refined sugar of exceptional purity can be had at somewhat less cost than with boneblack. Another advantage that is to be regarded as of some importance, is

Cmdr. Thomas E. Dabney c/o The Item New Orleans La

Mfr. Carbrox Co., Ltd., New Orleans, Louis.

Twenty Tanks Similar to Those Shown at the Left are Required in the Boneblack Process of Refining Sugar, for Doing the Work That can be Done by Three Filters Like the One Shown at the Right, When Using Carbonized Rice Waste

Copyrighted material

James A. Coffey, Coffey Engineering Co
1416 Broadway, New York City

Upper Left: Showing the Unusually Severe Test to Which a Sheet of Fiber Flooring was Subjected to Determine Its Fire-Resisting Qualities. The Intense Heat of an Oxyacetylene Flame was Applied for Several Minutes. Upper Right: After the Test; Only a Few Scorch Marks Resulted, Not Even Burning through the Sheet. Lower Right: How the Sheets are Laid Down. The Joints between Them are Later Filled with a Special Compound

that the reasonable cost for equipment will put the use of this material within the reach of small refineries.

This carbonized rice waste has possibilities as a decolorizing agent for coconut and other oils, as well as for glue, gelatin, glycerin, and many chemical solutions.

1911

NEW FIBER FLOORING HAS FIREPROOF QUALITIES

Claims of unusually fire-resistant qualities are made for a new type of fibrous flooring material recently developed and placed on the market. The material is made up in sheets measuring 16 by 28 inches, and in two thicknesses, 5/8 and 7/8 inch. It is also asserted that it is a nonconductor of heat, and will neither expand nor contract appreciably under temperature changes—both very desirable qualities. Its additional bids for merit as a floor covering, are that it is noiseless to the tread, oil and waterproof, and not slippery to walk upon. When laid, the joints between the sheets are filled with a special compound, making a floor covering of practically uniform texture. The sheets are laminated, all the long, narrow individual sections being held together by four parallel pins running through the sheet. Speed and ease characterize the labor of laying this floor.

1812

AUTO STEERING-WHEEL LOCK EASILY INSTALLED

One of the newer auto steering-wheel locks is made so that it can be easily installed by the owner himself. It consists of a section which is first clamped, then pinned to the steering post, and the lock proper. The latter is of the plunger type with two plungers, one on each side of one of the spokes of the steering wheel, and when in position prevents turning of the wheel.

Lampman Tool Co
Angola, Ind.

DEVICE REGISTERS QUANTITY OF OIL AND GAS IN TANK

The number of gallons of gasoline in the supply tank or the quarts and pints of oil in the crankcase of an auto engine, can be ascertained by the driver without leaving his seat, by means of a device recently put on the market. The indicator is placed on the instrument board, and from it are read either the gallons of gas or the amount of oil. In making a reading, one stroke on the pump handle located beneath the indicator, forces all the liquid out of the standpipe, which is then put in communication with the hydrostatic pressure of the tank by turning the lever to the register position. The gauge then shows the respective amounts on hand.

NEW LAMP LOCK ATTACHES TO BRASS SOCKETS

A new locking device that attaches to standard brass sockets and is intended to prevent theft of electric-light bulbs, is being placed on the market. It is simple in construction, being made of cold-rolled steel. When attached, it is nearly impossible to remove the lamp from the socket, and it is dangerous to attempt to do so without the use of the key. It is protected by an insulator that guards against shock.

PLAN MONUMENT AT CAPITAL FOR SOUTHERN "MAMMY"

A monument at Washington, D. C., to commemorate the virtues of the old southern "mammy" has been proposed by the Jefferson Davis chapter of the Daughters of the Confederacy. A government gift of land for that purpose is said to be under consideration by Federal authorities. While exact plans as to the form the monument will take have not been adopted, it has been suggested that it should be a seated figure of a middle-aged colored woman, the "real mammy type," with a "pickaninny" on one side holding her hand, and a white child on the other; this to symbolize the mothering she has given to the two races. Visitors to the South say that the cheerful, utterly unselfish mammy of the old days, whose character has become largely traditional, will soon disappear, and it is believed that she deserves a fitting memorial.

VERY DURABLE SCREWDRIVER WITH INSULATING HANDLE

Made from high-grade steel, a new screwdriver is tempered so as to give it such durable qualities that it is claimed to be indestructible. It has a handle, made of an insulating composition, which is secured by a patent locking device that prevents it from twisting on the shank. The insulation is tested to stand 15,000 volts. The blade is of selected steel, carefully forged and heat-treated, and extends through the handle. It is intended specially for the use of electricians and automobile mechanics.

¶Yellow, brown, chocolate, blue, and other bituminous paints, mixed and ready for use, and applicable without preparation of the surfaces to be painted, have recently been put on the market. The inventor claims that, no matter what the material to be painted, it need not be given the familiar red-lead priming.

This Photograph Shows the Density of the "Forest," Roswell, New Mexico, Planted. Once on a Barren Plain, the Town Began Setting Out Cottonwoods Nearly a Half Century Ago. Today the Trees Literally Hide 325 Homes, Three Churches, and a School

FOREST SURROUNDS HOMES OF CITY ON PLAIN

Shade trees in a city surrounded by the open-plains country of the Southwest have an appeal much stronger than in communities where any tree problem has been one of elimination rather than of production. On that portion of the plains which is now known as Roswell, N. M., cottonwood and elm trees have been planted with fervor since the 80's, and as an example of what can be accomplished, this city now has in its midst a veritable forest of shade trees. So dense is the growth that even without the foliage the branches of these city trees are thick enough to hide 325 homes, three churches, and a school. Property owners are required to care for all trees on and near their property. A special permit is required before any can be cut or removed.

TELEPHONE LINEMAN USES HANGING CHAIR

A comfortable seat while making wire repairs is provided by the handy device developed by a western lineman for his own use. The chair is mounted on a collapsible platform, which is carried about on a small truck. On short trips this lineman wheels his little truck about by hand, but on longer ones it can be attached to an automobile. Ropes and pulleys are used for elevating the platform and chair and keeping the whole on a level. The lineman finds that having a secure and comfortable seat improves the character and increases the amount of work done.

Showing How an Ingenious Lineman Lightened His Daily Grind by Using His Inventive Powers: Incidentally, He Is Able to Accomplish More and Do Better Work

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1889

CIVIC FEATURES THAT PROMOTE THE COMFORT

This Is the Entrance to the Thirteenth National Orange Show, Held at San Bernardino, California. This Annual Event Is of Considerable Importance to Southern Californians, and Always Draws Huge Crowds. Naturally, Most of the Space is Devoted to Exhibits and Feature Displays of Fruits

Right: Queen Anne Granted the Land upon Which This Church was Later Built at Wells, Vermont. It Is 160 Years Old. The Large "Windows" over the Door Are But Cleverly Painted Imitations — This Because of the Prohibitive Cost of Glass in Those Days. Left: A Sundial, Erected on the Bank of the Fox River, Illinois, Marks the Site Where Lincoln was Mustered Out of Army Service after the Black Hawk War

Two Years were Spent by an Artist in Edwardsville, Illinois, in Painting This Bird's-Eye View of His Home Town. His Painting Measures 5 Feet High by More than 20 Feet Long

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1887

AND ENJOYMENT OF VISITORS AND RESIDENTS

The Tourist Overtaken by the Dark will Find Ample Hospitality If He Spends the Night at Pendleton, Indiana. A Comfortable Camp is Provided, Equipped with Running Water, Electric Lights, and Gas for Cooking, All Free. It is Supported Entirely by the Townspeople

Above: Bellevue, Iowa, on the West Bank of the Mississippi, Has a River-Front Park, Extending the Entire Length of the Town. This Boat Landing Is One of the Numerous Beauty Spots of Bellevue. Left: A Simple, Sturdy Memorial, Erected by the Local Post of the American Legion on the Park Lawn. Below: Bellevue's Park Driveway, Skirting the River

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The Everite Mfg Co
132 W. Madison St
Chicago.

Flash Sales Corp
4809 N. Ashland
Chicago

CHECK PROTECTOR WEIGHS ONLY HALF POUND

The latest check-protecting device that has made its appearance claims the merit of extreme simplicity, and weighs only

This Check Protector, Nickel-Finished, is Gripped in the Hand Like an Office Punch, and Carries a Self-Inking Printing Dial in Its Interior

½ pound. It is handled like a small office punch, being gripped in the hand and the check inserted under two guides. A hard-rubber knob, grooved to facilitate turning accurately, carries all the necessary figures and characters on its circular edge. As each figure is set, the handles are squeezed and brought together; this action makes a red-ink impression of the figure which also bruises the paper and prevents erasure. On releasing the handles the check is automatically advanced a space ready to be given the next impression.

TONS OF DUST TRAVEL IN THE SKY

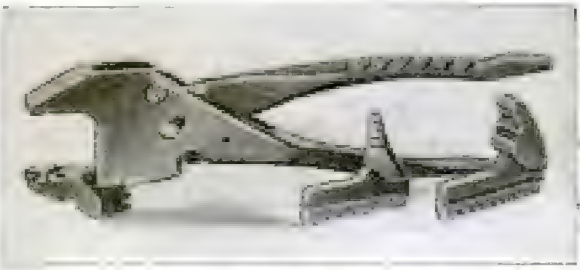
Two thousand tons of dust was deposited per square mile in the vicinity of Laramie, Wyo., recently, according to the calculations of Prof. S. H. Knight, of the University of Wyoming. This dust was partly transported from other western states. Such deposits are comparatively large in all western states, though usually more than 90 per cent of the dust is of local origin. Only the very finely powdered dust travels very far, though some has been carried from Utah, Nevada, and Arizona to Wisconsin and Ohio, as microscopic examinations have revealed.

The most favorable condition for precipitating the dust is, paradoxically, a snowstorm, though the late summer showers in the arid states are much more heavily freighted with dust, at times even mud. The rain and snow serve to filter the air, leaving it very clean. At times in the western states, clothing, windows, walls, and all other objects exposed at the beginning of a storm coming after a prolonged drought, will become badly smeared.

There are accounts of other heavy dust deposits, upward of 800 tons per acre being reported in one instance in the Dakotas. But where the dust deposited has been lifted from the Rocky Mountain region and carried to Wisconsin the amount seldom exceeds 15 tons per acre.

WRENCH COMBINATION TOOL HAS STRONG GRIP

There has recently been introduced a combination tool which is essentially a wrench with a movable jaw that carries teeth engaging segmental gear teeth on the end of one of the plierlike handles. Three interchangeable jaws convert the tool into a wrench, suitable for many



The Three Interchangeable Jaws of This Tool Convert It into a Wrench for Several Purposes

purposes. The arrangement of the movable jaw provides for adjustments.

METAL AND GLASS WELDED BY SIMPLE METHOD

Electrical fittings have recently been made in which copper and porcelain or glass were welded by a new method which is declared to be as cheap as it is effective. The copper rod, or rivet, is threaded through the porcelain or glass and a pressure of one-half ton applied for a quarter of a second, during which interval heat is instantaneously applied to effect a fusion.

J. Cecil Allen, No 3 Boston Bldg. Salt Lake City Utah

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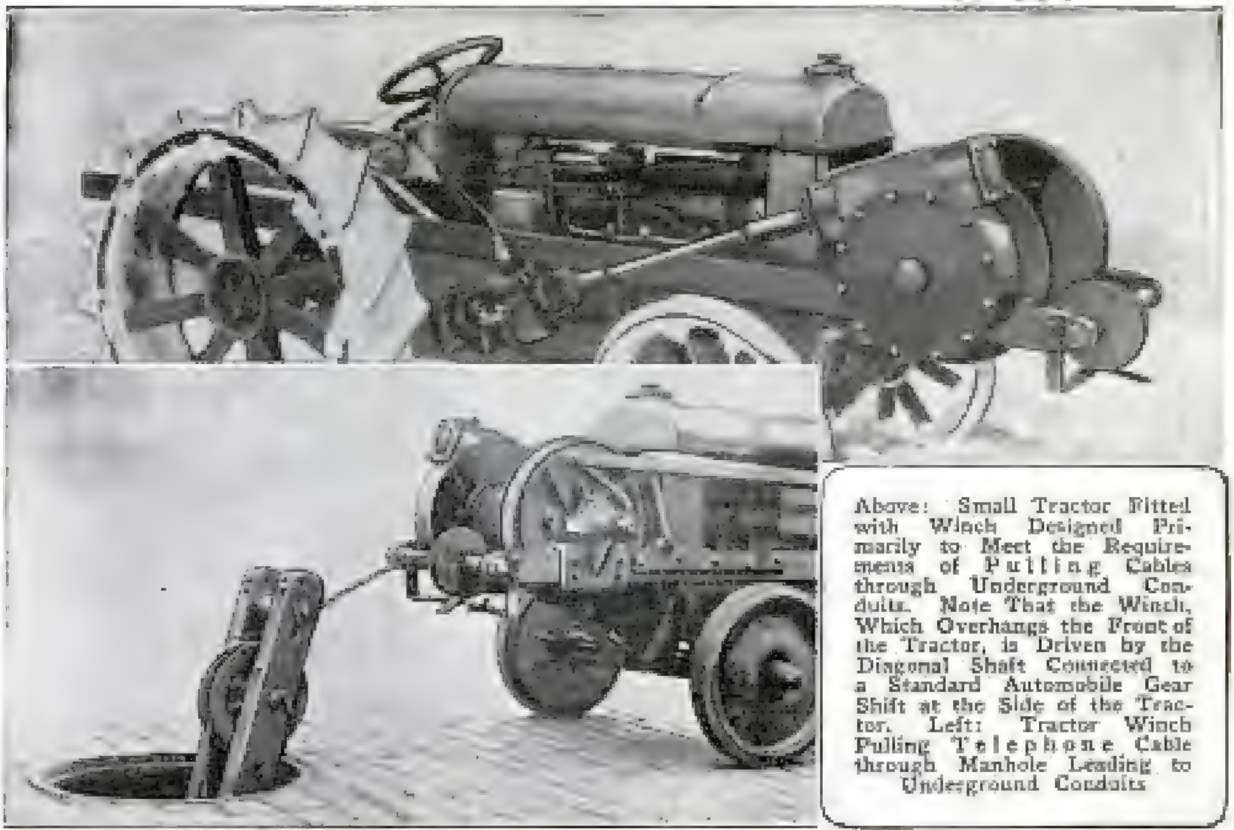
1778 Jno. J. McO'Connor
Sheffield
Pa.



Above: Small Tractor Fitted with Winch Designed Primarily to Meet the Requirements of Pulling Cables through Underground Conduits. Note That the Winch, Which Overhangs the Front of the Tractor, is Driven by the Diagonal Shaft Connected to a Standard Automobile Gear Shift at the Side of the Tractor. Left: Tractor Winch Pulling Telephone Cable through Manhole Leading to Underground Conduits

1778

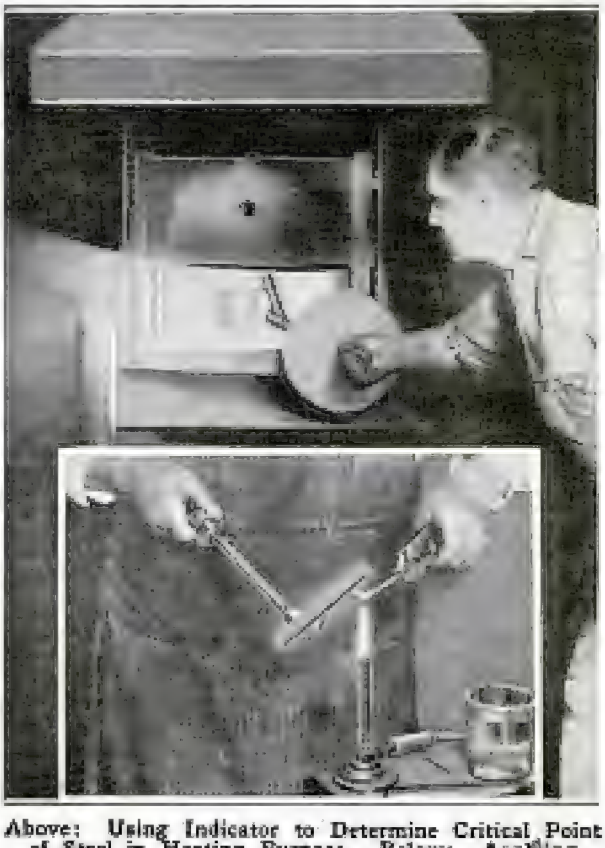
WINCH DESIGNED TO ATTACH TO FRONT OF TRACTOR

A new winch that attaches to the front of a tractor has been designed to pull cables through underground conduits satisfactorily. Though intended for use in telephone work, it is adaptable for many other purposes. The objection to some tractor winches that they have only one speed, has been overcome by introducing an ordinary automobile transmission between the power shaft of the tractor and the cable drum. Power is transmitted from the tractor through a set of gears to the transmission and through a cone clutch to the winch drum, thus providing three speeds forward and one reverse.

1769

DEVICE SHOWS CRITICAL POINT IN HEATING STEEL

A new device for determining the critical point in the heating of steel, by indicating when the steel ceases to be magnetic, is a light self-contained instrument that can be held in one hand and is free from leads or electrical connections. The indicator receives its magnetism from a permanent magnet which is protected from injury by its location within the instrument itself. Inasmuch as the test is applied to the steel instead of the flame, the device can be used in the course of hardening a small piece of steel, such as a tap, when heated over a Bunsen burner. The device requires no calibration.



Above: Using Indicator to Determine Critical Point of Steel in Heating Furnace. Below: Applying Test to Steel Heated over Bunsen Flame

Herman H. Sticht + Co. 15 Park Place
New York City

1942 Portland Construction Co
Portland, Maine

Considerable Rivalry among Various Cities and Villages has Sprung Up Concerning the Question of Which Has the Widest-Paved Thoroughfare. Here are Shown Two Views of the Work of Paving Main Street, Keene, New Hampshire, with Concrete. Keene Claims the Widest-Paved Street in New England. In the Upper Photograph are Seen the Details of the Construction, and the Great Width of the Thoroughfare Permits Inspection of the Various Steps in the Work. Below are Shown the Piles of Gravel and Rolls of Wire Netting Used as a Foundation for the Layers of Concrete

Copyrighted material

TURN WORN-OUT MONEY BACK INTO PAPER

Worn-out United States currency representing millions of dollars, cut up and pulped, has been shipped to the Forest Products Laboratory at Madison, Wis., to be used experimentally in the manufacture of paper. Prior attempts at the laboratory resulted in paper of a poor quality, but it is expected that with a new cleaning process a more satisfactory product will be obtained. As much as two to three tons of paper money are discarded and destroyed on occasion at the treasury in Washington, D. C. If the experiment proves successful, the government will continue the pulp shipments.

WATER-PROPELLED NOZZLE CLEANS SEWERS

A two-part water-propelled nozzle, made of bronze, has been developed lately for removing obstructions in sewer or drain pipes. The two parts are connected by a ball-bearing swivel mounted between them, the head, or forward end, being pointed and containing a series of diagonal vanes to produce a rotary motion when in action. When connected to a hose and the water is turned on, the latter escapes through perforations in the rear of the head, causing the nozzle to impel itself forward and drag the hose after it. The point of the head is also perforated, so that part of the stream serves to loosen up the obstructive material.

AUTO-STEERING ATTACHMENT IMPROVES CONTROL

A new device has been developed for eliminating the wobbling of front wheels, particularly in cars whose steering posts are not fitted with a worm gear. The attachment is made of cast bronze, in two halves, which clamp around the post, the upper half being loose and the lower one tight. An adjustable spring that provides tension between the two halves, comes into play when the steering wheel is turned.

NEW ISLAND REPORTED FOUND NEAR FRENCH INDO-CHINA

A new island, believed to be of volcanic origin, is reported to have been sighted between the Philippine Islands and French Indo-China. It is said to be about 50 feet above sea level and a half mile in circumference. Farther east, in the Pacific Ocean, a governmental scientific party is exploring Bird Island, one of the bits of isolated lands in the Hawaiian archipelago. This expedition also intends surveying most of the islets between Kauai and Midway Islands of the Hawaiian group.

WIDEST GRANITE CONCRETE ROAD IN THE WORLD

What is claimed to be the widest concrete-paved street in the world is laid at Keene, N. H., and measures 140 feet from curb to curb. On account of the lack of suitable trap rock or gravel in the state, and great prevalence of granite and marble, crushed granite was used in the concrete. After excavating to subgrade, the latter was rolled, and a 7-inch slab, reinforced with steel mesh, was applied to the roadway. The unusual width necessitated a division down the center line, each 70-foot section being again divided into three parallel lengths separated by butt joints. In order to lay out safety lanes at the street crossings, the concrete at these points was mixed with a portion of lampblack, and a 10-foot section, 2 inches thick, was laid over the ordinary mix to present a sufficient contrast between the safety lanes and the remainder of the pavement.

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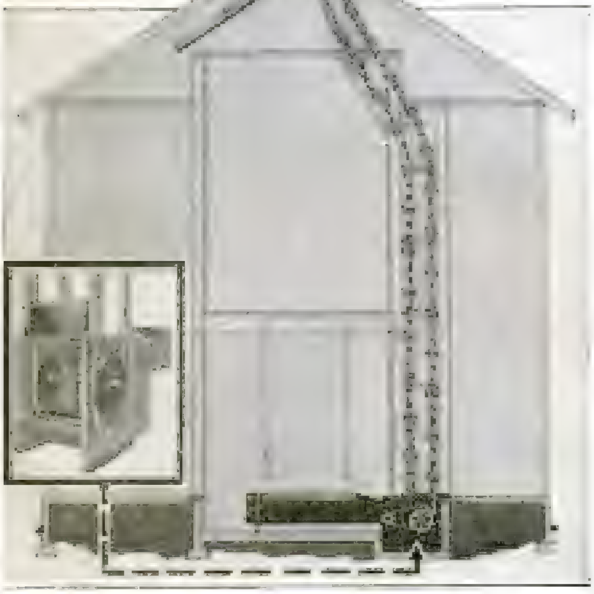
Portable Elevator Mfg Co, Bloomington, Ill.

SIMPLE BUCKET ELEVATOR STORES FARM GRAIN

1856

A simplified type of bucket elevator intended greatly to facilitate the work of the farmer when storing corn or grain, has been placed on the market. Rolled-edge buckets with welded



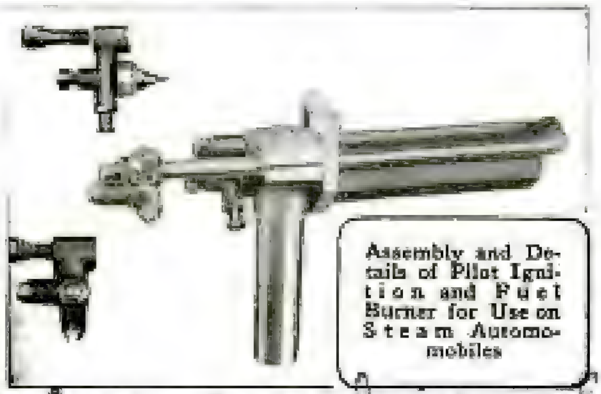
Sectional View of the Bucket Elevator Set Up in a Corn Crib: It Is of All-Steel Construction, and Has Only One Shaft and Two Bearings

joints are provided in the new elevator. These are mounted between an endless steel strap, whose links pivot on roller bearings, a feature which lessens the power requirements of the drive. Its capacity is 100 bushels of grain elevated in from three to five minutes, on a gasoline consumption of 1 gallon in 10 hours.

PILOT IGNITION DESIGNED FOR STEAM CARS

1843

A new pilot-light assembly now on the market, for use as an ignition device for the fuel burner used on steam automobiles and trucks, features a rapid vaporizer that, it is claimed, does not collect carbon, and an arrangement of the air intake that prevents the pilot from being blown out.



Assembly and Details of Pilot Ignition and Fuel Burner for Use on Steam Automobiles

HELICOPTER RISES 20 FEET WITH NEW MOTOR

2034

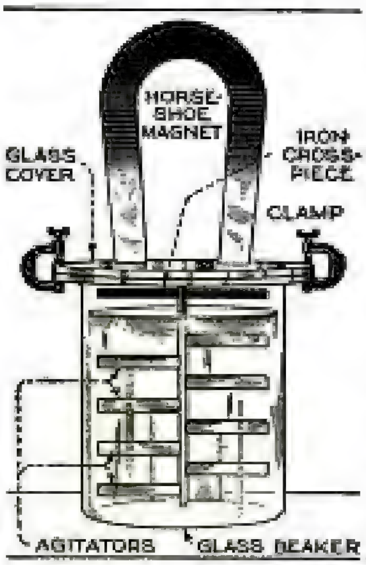
A new record was recently made at McCook Field by the De Bothezat helicopter, when a height of 20 feet was attained in several tests, none of which lasted over two minutes. The improvement over previous performances is attributed to a new 200-horsepower rotary motor with which it is anticipated a height of 100 feet can be reached.

Chicago Tribune 4/7/23

MAGNET TURNS STIRRING RIG INSIDE CLOSED DISH

1800

A clever arrangement has been devised for stirring solutions that the chemist often finds necessary to keep from contact with the air, and which, for various reasons, cannot be put in containers, that are susceptible to shaking. The agitator, which somewhat resembles the mixer of an ice-cream freezer, is mounted on a spindle which is pivoted at the bottom and the cover of the vessel, and carries at the top an iron crosspiece. On the outside, and just above the cover, is mounted a strong magnet which is provided with a suitable driving means. When the magnet turns, the iron crosspiece at the top of the agitator spindle follows, thus creating the stirring action.



¶Surrounding Chicago's sewage-disposal plants with parks and golf courses is being considered by city officials. The plan has been recommended to offset the "sentimental" damage done to adjacent property under present conditions because of public dislike of such localities.

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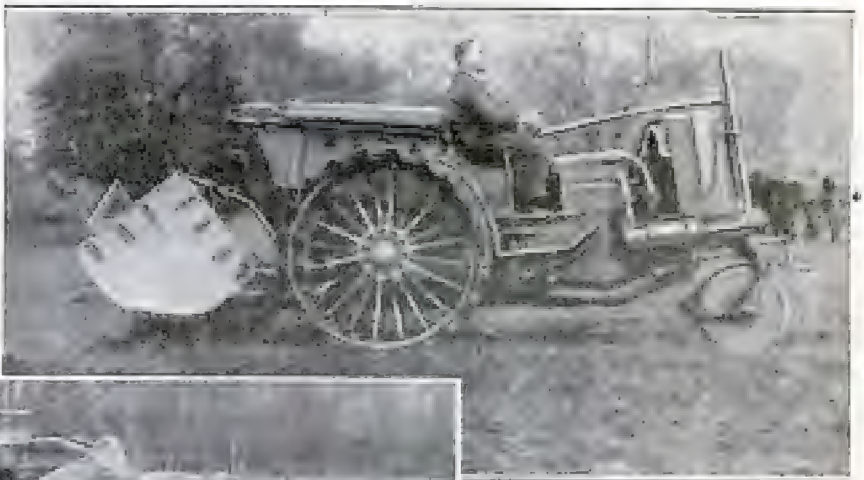
1946 Cut. George E. McVichie
North Bend, Nebr.

GOPHER HAS MECHANICAL FARM RIVAL

An interesting attachment for use with a farm tractor has been placed on the market, which greatly helps the farmer to till his soil. Instead of breaking it with a plowshare into lumps which later have to be broken with a harrow, this machine digs up the soil almost as a gopher does with its paws, and throws it back into a well-pulverized seed bed. The tractor, which is of 35 horsepower, may, of course, be used without the tiller for general purposes, as the latter is easily detachable.



The New Mechanical Soil Gopher in Action, Operated by a 35-Horsepower Engine. It Propels Itself Along as It Tills the Soil

Details of the Construction of the Mechanical Badger, Showing the Hooks Which Act Like the Paws of the Little Animal, Digging Up the Soil and Throwing It Back into a Well-Pulverized Seed Bed

1961

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AUTOS WITH ENDLESS TREAD SUCCESSFUL IN NORWAY

TWO automobiles equipped with endless-tread traction, not long ago successfully underwent severe tests near Christiania, Norway, where they were made to climb steep hills, cross ditches, and traverse underbrush and deep snowdrifts. The endless tread, which is quite similar to the traction rig of the tanks used during the war, enables the machines to travel at a good rate of speed under adverse conditions. The machines have finished bodies like an automobile, and the chassis is of the same type as that used on the trucks that crossed the Sahara Desert recently, as recorded in the March issue of this magazine.

- Citroen - Christiania, Norway.

American Representative - Transportation Development Corporation, 21 E. 40th

C. Muirhead / Elmer S. Christian Science Monitor
Stack Division, 4/3/23
Riverside Boiler Works,
Cambridge Mass. 2045

1820

TANK WATER HEATER USES NO COILED TUBES

The copper coil of tubing found in most tank water heaters is dispensed with in a new type of heater which uses a

The Construction of This Heater Embodies a Departure from the Usual Coiled-Tubing System. The Burner is Designed to Prevent Flash-Backs

number of straight vertical tubes. The advantage claimed is that circulation of the heated water is very rapid, on account of the small travel necessary. The heater is tested to a pressure of 600 pounds per square inch, many times the pressure it would be subjected to in ordinary use. What is asserted to be a nonflash-back burner is incorporated with the heater, doing away with the annoyance which frequently occurs when the gas pressure fluctuates.

DUTCH RADIO STATION SPANS 12,000-MILE GAP

A new radio station recently installed at Kootwijk, Holland, makes it possible for the Dutch government to communicate directly with its East Indian colonies, without dependence upon foreign cables, as has hitherto been the case. A station at Bandoeng-Malabar, Java, has been equipped to both send and receive messages from Holland. The Kootwijk station is a sending station only, messages being received at Sambeek, 20 miles away. This receiving station is equipped with the most modern apparatus, including registering writing machines and machines that print the signs in relief on wax rolls, so that they can be reproduced vocally in much the same way as a phonograph record. These instruments are specially useful for automatically registering dispatches, as these are sent out with great speed.

MAMMOTH AUTO TRAILER HAS FREIGHT-CAR CAPACITY

1892

The rapid increase in transportation by truck has been followed closely by an increase in truck capacities to meet this growth, and finally by the rapid development of trailer trucks. Perhaps the largest of these yet to appear is now being used in the transportation of automobile bodies, and is fully 40 feet long, exclusive of a 10-ton truck which hauls it around. It is of substantial pressed-steel construction, 8 feet wide by 12 in height, and is roomy enough to accommodate 24 bodies at one time. It is carried on only two axles, one of which is the rear axle of the truck proper, but the tread is very wide to distribute the load better.

This Giant Rival to the Railroad Freight Car Bids Fair to Snatch Considerable Traffic Away from It. It Is 40 Feet Long by 12 High and 8 Wide, and Holds 24 Automobile Bodies. Rounding a Corner with This Outfit Is Something Like Swinging a Hook and Ladder Truck around a Curve

Detroit Trailer Co. Detroit Mich.
954 E Milwaukee Ave

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1311 Owner of farm Jack Allman
Griffith Park, Los Angeles, Calif.

The Owner and the Small Snake Pit at the Rear of His Parking Lot opposite Los Angeles Courthouse: A Two-Acre Pit is being Built near Los Angeles for the Commercial Breeding of Snakes and Other Reptiles

COMMERCIAL SNAKE BREEDING IN CALIFORNIA

BY ARCHE M. DUNNING 923 Arapahoe St. Los Angeles Calif

A HUGE concrete-walled pit where snakes and other reptiles will be kept and permitted to breed under surroundings similar to their natural environment will shortly be established near Griffith Park, Los Angeles, Calif. This novel idea is being carried out by a citizen of Los Angeles, well known throughout the Southwest as an expert on rattlesnakes and reptile life. The pit will cover two acres, excavated below the level of the surrounding terrain and inclosed by a high and wide concrete wall, with a promenade atop. At intervals, similar walls will cross the entire tract, thus giving visitors ready access to any section.

Rattler's Fangs, of Which There Are 14 to a Set: Two Are Striking Fangs, Two Are Floating Fangs, and 10 Are Reserve Fangs

Almost every reptile indigenous to the country, with the exception of alligators and crocodiles, will be found here. Near the center of the tract is to be located a swampy pool for water moccasins of all obtainable varieties, spreading adders, and creatures of the lizard family that thrive in such surroundings.

Rattlesnakes will, however, be the main attraction, and arrangements for the delivery this spring of 5,000 from a Texas dealer have already been made. Rattlers produce from 25 to 45 young in each litter, and the young attain maturity in one year. Consequently, there will be no lack of "stock" once the pit is in active operation.

Snakes will be supplied to the moving-picture studios and for educational films. Snake oil and venom will be marketed in quantities. The oil is said to be of value in the treatment of rheumatism and is in demand among mechanics who do finer grades of machine work. There is a

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steadily increasing call for the venom from physicians, chemists, and others, who use it for medicinal purposes. The supply is inexhaustible, for each snake may be deprived of its venom every eight or nine days without injury. Rattlesnake skins are sought by manufacturers of novelties, and there will be no difficulty in disposing of all that can be produced, it is believed.

Extracting Venom from a Snake Whose Upper Jaw is Held over the Rim of the Goblet: Note Pool of Venom at Bottom of Glass

Close by the pit an additional half acre is to be similarly fitted up as a breeding place for rats and mice to be used as food for the inmates of the pit. The weekly bill of fare, at first, it is estimated, will be from 10,000 to 15,000 rats and mice. Vice versa, snake carcasses will be fed to the rodents. Papier-mâché dens with hinged tops that may be lifted will be a feature of the pit. This will afford an excellent opportunity to make a close study of the reptiles under various conditions and in the various seasons of the year. The originator, who has been studying, capturing, and exhibiting reptiles, mostly snakes, for the better part of 35 years, is the authority for some interesting statements.

The Originator of the Snake-Farm Idea at Los Angeles, Playing with Some of His Pets in His Private Snake Pit

"The rattlesnake is a gentleman among reptiles," he says, "because he never strikes unless molested, and even then gives his victim timely and ample warning. The 'hoopsnake' of folklore is a myth, and the 'jointed' snake credited with disintegrating itself into living sections at will, exists only in imagination. Most snakes are rendered dangerous only because of their own timidity, and occasionally one dies soon after capture, literally frightened to death." Rattlesnake flesh is a succulent and delicious edible, resembling frogs' legs in flavor and appearance. The number of rattles is not a certain indication of a snake's age. Sometimes two rattles grow a year. Only one snake native to the United States is susceptible to music. That is the "silver racer," found in California and in many of the middle-western states. This snake is particularly charmed by the twang of the jew's-harp, and will approach within a few inches of the player if the harmony is sustained for a moderate length of time.

The snake fancier's experiences with snakes started on his father's Iowa farm at the early age of seven. On his way to school one day he climbed an apple tree in pursuit of a woodpecker that had dodged out of sight into a knot hole. He plunged his hand into the hole and pulled out a blacksnake that had half swallowed the bird. Too frightened to let go, he dropped to the

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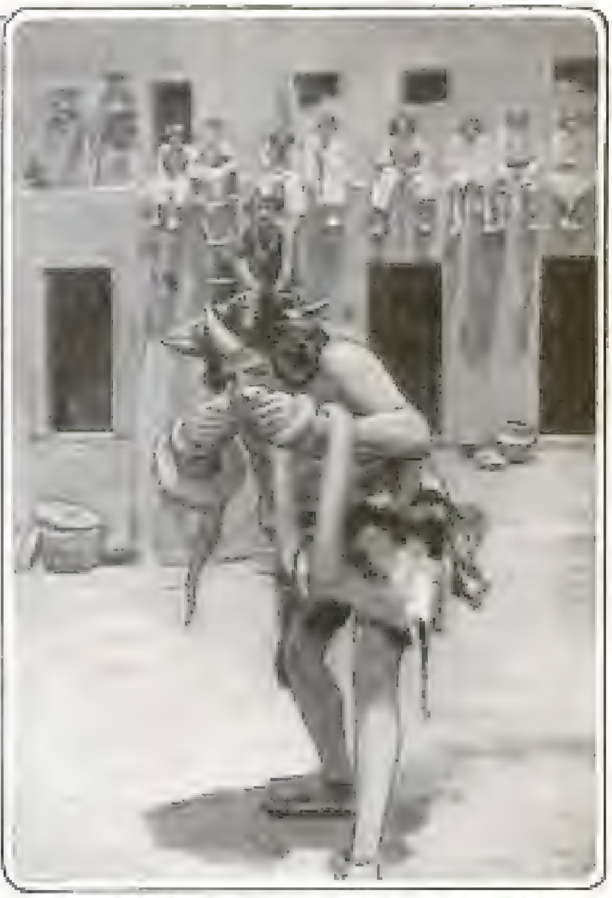
Left to Right: The Snake Trainer and Two Moving-Picture Men Watching Rattlers Used in Film Version of "The Virginian"



Los Angeles Expert Snake Trainer in the Garb of a Zuñi Indian Chieftain, Doing an Indian Snake Dance with Two of His Pets

ground with his gorged prize, and taking it home placed it in a box behind the barn.

The thrill of the capture remained with him, so he hunted for more snakes and added them to his collection until he had perhaps a dozen. The neighborhood boys, at one cent each, were permitted to peep. After a while, a carnival company with one "Bosco, the Snake Eater," came to a neighboring town. Bosco heard of the collection, rented a horse and buggy (it was before the days of automobiles), came out to make an inspection, and bought the lot for $10. That settled it as far as the amateur collector was concerned. Snakes from that time on were his absorbing passion. Their habits became the subject of his constant study, and their habitats his constant quest.

His travels have led him into the wildest sections of Old Mexico and over sterile Texas plains. He has captured the deadly water moccasin deep in the moss-hung Florida Everglades and in the sodden swamps of Arkansas. He has endured for weeks the terrific heat of Death Valley in order to get first-hand information regarding the reptile life of this sandy waste. When he first came to Los Angeles, moving pictures were just getting a start there. It was before the day of the esthetic "silver screen" and elaborately staged productions. Movies to be successful had to have an element of novelty and danger. Hence the advent of "Hugo."

Hugo was a South American python, 22 feet 8 inches long, weighing about 160 pounds. He was, notwithstanding his size, the one snake that the collector ever succeeded in thoroughly subduing, and it took the trainer six months after his purchase to accomplish it. For hours at a time the man worked with the big reptile in a room 12 by 14 feet, with a padded pillow to ward off the blows of the savage jaws. Finally, however, the snake Hugo became so tractable that he would drape himself over a beam and coil the lower part of his body into a swing for his master.

"The Coil of the Python," a prehistoric cinema thriller, was Hugo's most notable starring vehicle. During the big scene of the production, the trainer allowed the python completely to coil upon him at the imminent risk of being crushed into a pulp. As a matter of fact, it took all his skill and 20 minutes of hair-raising effort to extricate himself at the conclusion of the scene.

He accomplished it by tickling Hugo in the tummy!

The trainer's moving-picture experiences all had their part in fitting him for the management of his pit, which he plans to make his future life work.

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NEW TEAR-GAS GUN MAKES EFFECTIVE WEAPON

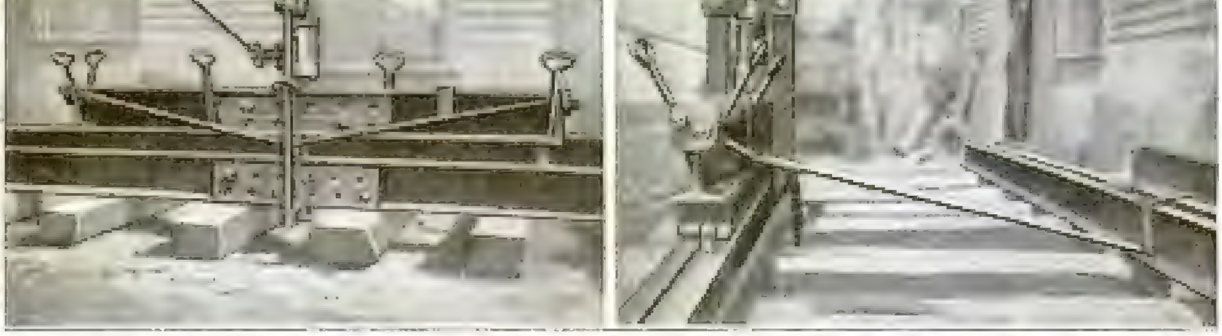
A new tear-gas gun is being marketed for the use of police officers and other representatives of the law, to whom it is released only after recording the serial number of the weapon. It is designed to be used in quelling riots; in making raids, when the inmates of a room can be subdued by discharging the gas through a keyhole or similar opening, and in other work where physical injury is to be avoided. The gun consists of two cylinders, each 2½ inches in diameter and 7 inches long. One cylinder is charged with air at 1,800 pounds' pressure, and the other contains a tear-stimulating liquid which is vaporized through a nozzle by operating the air-cylinder control valve.

BENDING DEVICE RENDERS OLD RAILS USABLE

A rail bender, developed for use on an eastern street railway, was designed for the purpose of taking out the vertical bends from the ends of rails, caused by car wheels passing over the rail joints. The bender, which is operated by a 35-ton jack, is made of several pieces of old rail mounted on two movable legs, so as to accommodate short or long bends. The operation consists in passing a heavy yoke under the rail and over the jack, which is then pumped up, bending both rail ends and plates slightly above level.

AUTO CAM GEAR INCREASES STEERING LEVERAGE

A type of steering gear for automobiles just placed on the market makes use of a cam-and-lever arrangement which greatly increases the leverage at the driving wheel and also hastens the turning action. The cam, or actuating member, is similar in appearance to a single-thread screw of varying pitch. In mid-position the pitch of this cam is very slight, and the motion slow, so that in straight-ahead driving considerable road shock is taken up before reaching the wheel. As the pitch increases, however, the motion increases rapidly toward either extreme of the cam; the result being that only a slight turn of the steering wheel is necessary in rounding a corner. The cam is mounted in ball bearings. Because of its rapid action, great facility is given in parking a car close to the curb in congested districts.



Left: Side View of Rail Bender in the Process of Straightening the Bent Ends at a Rail Joint. Right: End View of Bender, Showing the Yoke That Holds the 35-Ton Jack to the Rails, and the Brace Which Keeps It from Tipping

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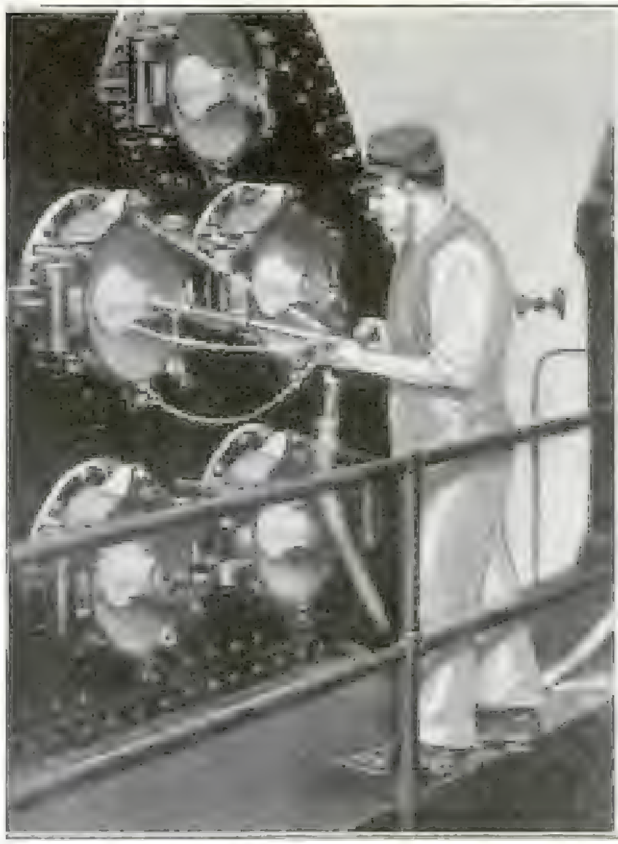
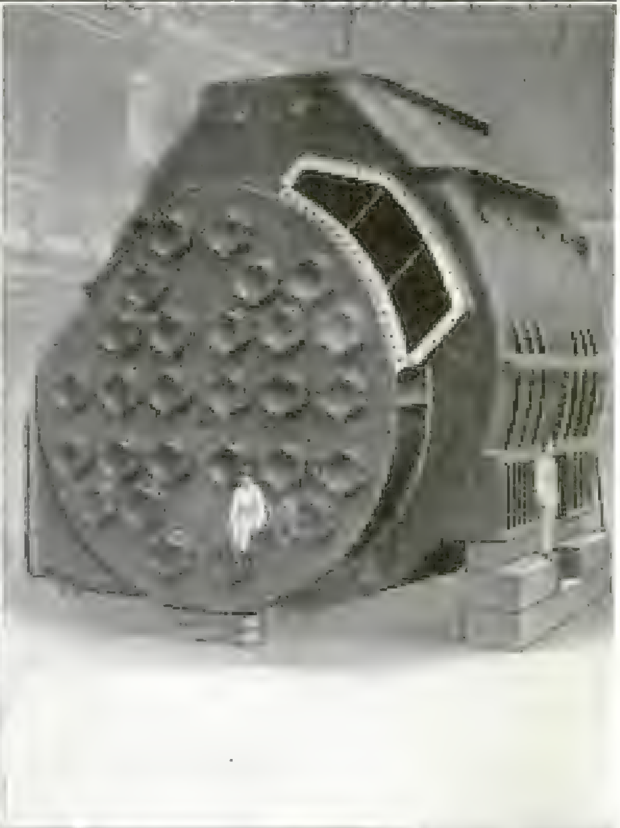
1847 Cont. W. A. Cather;
751 Kearny Ave.



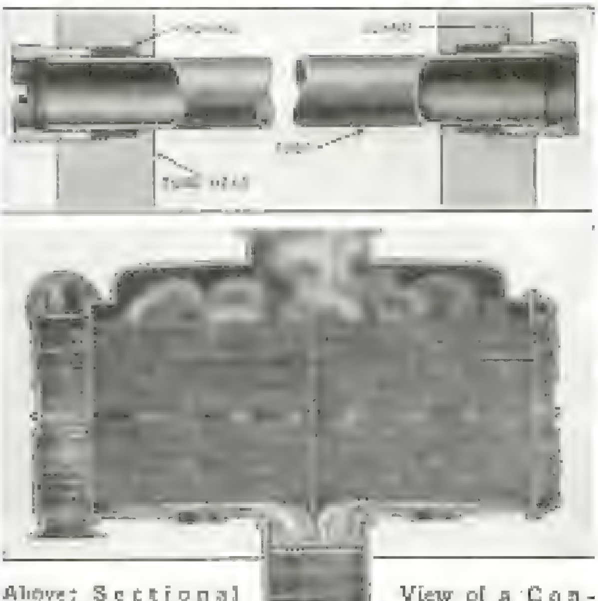


Left: Operator Using New Device Which Cleans Mud from Condenser Tubes, While Condenser is Operating, with a Jet of High-Pressure Water. Right: Large Surface Condenser Which Contains over 50 Miles of ¾-Inch Copper Tubing

1847

HIGH-PRESSURE STREAMS TO CLEAN CONDENSERS

One of the great nuisances in many power plants is the mud and slime that collect in the tubes of steam condensers. This foreign matter is brought into the condenser with the circulating water which is pumped through the tubes to cool and condense the steam on the outside of the tubes. After a few weeks' operation the tubes have a very noticeable coating of mud; hence the necessity of a tube cleaner. The mischief caused by the mud is quite apparent when it is remembered that dirt is a poor conductor of heat and acts as an insulating material inside the tubes, preventing the normal action of the condenser.



Above: Sectional View of a Condenser Tube. Below: Longitudinal Section of a Surface Condenser Illustrating Action of Steam around Tubes, and Accumulation of Condensed Steam in Hot Well

There are a number of more or less mechanical means of doing this cleaning, but most of them require that the condenser should be shut down.

In a new device the condenser is fitted with special plates on the shell opposite one end of the tube nest. Each plate has a socket and check-valve arrangement through which a nozzle may be inserted and high-pressure water turned on, so that the nozzle shoots a stream of water into each tube. The force of the water jet dislodges any collected dirt, and after a few moments' application, the tube has been literally scoured clean. The socket is so constructed that the nozzle may be turned about until it has played over every tube within the range of that particular plate. Other plates give access to the other tubes.

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SOME NOVEL AND LITTLE-KNOWN ACCESSORIES

This Spool Serves as a Pincushion, and Has a Little Felt-Cushion Center, Shown at the Upper Right

A Knife-Edge Sheet of Water is Used in this Dishwashing Appliance for Cleaning All Kinds of Tableware and Dishes. Its Action upon Grease Is Similar to That of a Razor, and the Cabinet Eliminates All Splashing

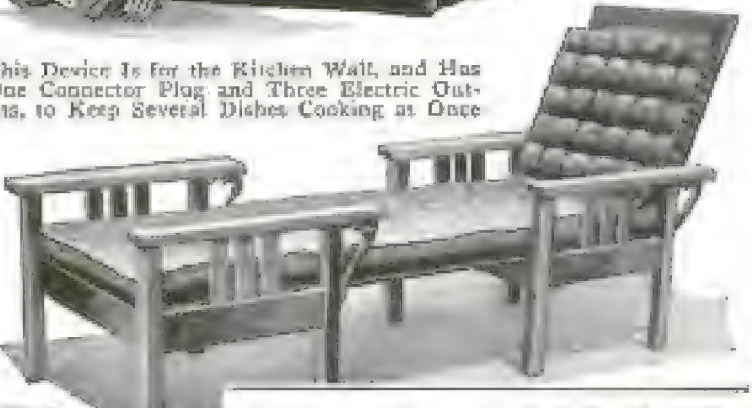
One Hundred Hours of Light on a Teaspoonful of Kerosene Is the Claim for This Lamp. The Barrel Portion is Filled with Cotton

The Advantage of This Ironing Board Is That It Lies Flat against the Wall When Not in Use. A Hinge Permits the Board to be Swung Out Horizontally

The Spout on This Coffeepot cannot be Broken Off, for the Reason That It Has None. Even the Handle does Not Project

This Device Is for the Kitchen Wall, and Has One Connector Plug and Three Electric Outlets, to Keep Several Dishes Cooking at Once

Something New in Oil Stoves: The Burned Fuel is Vaporized and Consumed Completely, without Smoke or Soot. The Shelf Is Sufficiently High to Permit the Use of a Wash Boiler



Combination Chair and Bed, for Both Day and Night Use: The Back Is Adjustable, and can be Tilted to Suit the Convenience of the User. It Is Very Comfortable, and can be Used Where There Is No Room for a Full-Sized Bed

Anyone wishing further information on devices in the editorial pages can

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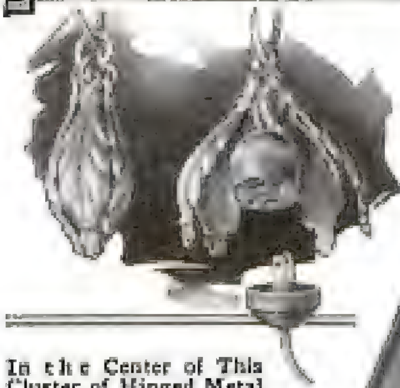
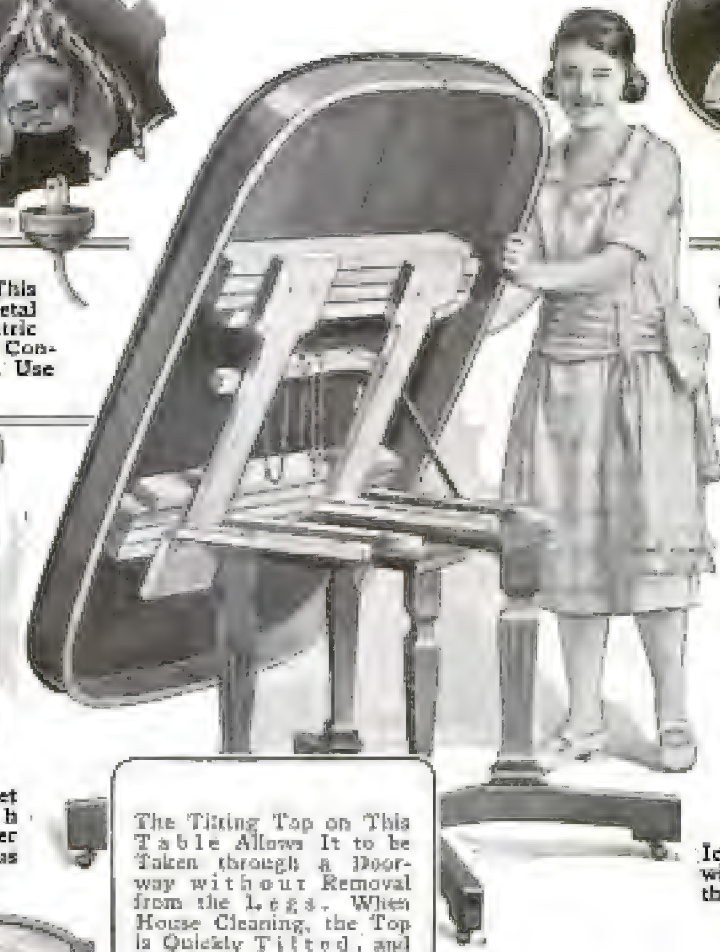
INTENDED FOR THE HOME AND ITS MEMBERS



In the Center of This Cluster of Hinged Metal Petals Is an Electric Socket, Ingeniously Concealed When Not in Use

A Light That Is Easy on the Eyes Results When This Shield is Slipped over the Bulb. It Comes in Sizes to Fit All Bulbs



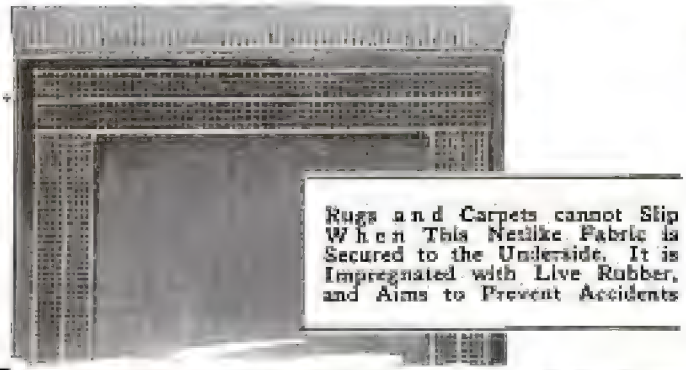
The Tilting Top on This Table Allows It to be Taken through a Doorway without Removal from the Legs. When House Cleaning, the Top is Quickly Tilted, and Moved Out of the Way. It Has Twin Pedestal Legs, Mounted on Casters, So That It can be Rolled About Easily

An Attractive Toilet Accessory, Which Contains a Silk-Fiber Puff and a Generous Supply of Powder

Ice-Cream Making Is Easy with This New Stand for the Machine. It Weighs Only 3½ Pounds

Butter can be Made Quickly in This White-Porcelain Churner. Turning the Crank Results in a Rocking Motion, and the Transparent - Celluloid Top Makes It Easy to See When the Butter Comes

Decorative Articles of Furniture, of Which This Chair Is an Example, Are the Product of an Eastern Manufacturer. They are Woven by Hand from Sisal, Hemp, or Cotton Rope, by a Patented Process



Rugs and Carpets cannot Slip When This Netlike Fabric is Secured to the Underside. It is Impregnated with Live Rubber, and Aims to Prevent Accidents

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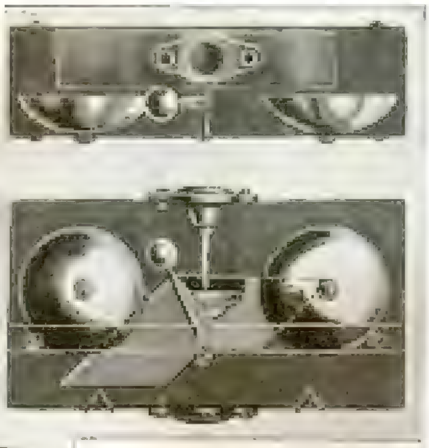
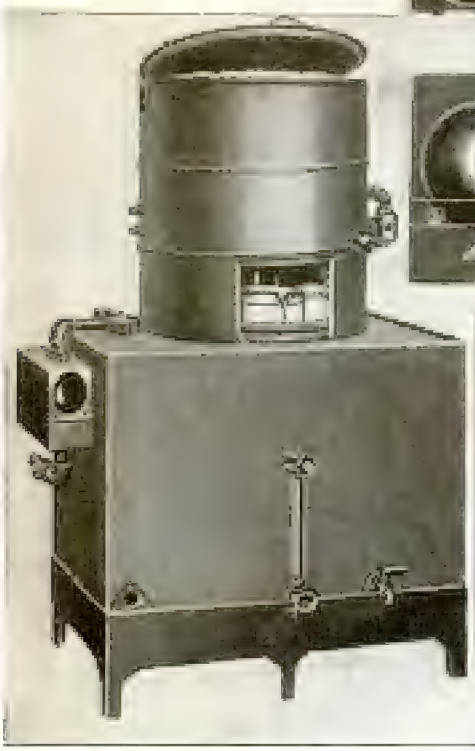
Wm. W. Nugent & Co.
146 W. Superior St
Chicago

T062

OIL-FILTER ALARM WARNS OF CLOGGING

A clogged oil filter is worse than useless, and heretofore the only method of insuring certainty of uninterrupted operation has been frequent inspection. The result is that the filter frequently becomes flooded and overflows, or the flow of oil to the lubricated parts is less than the requirements. In a new device, an automatic alarm is incorporated which gives ample warning when the straining bags begin to clog up. The supporting rings of the bags are made with an overflow spout which conducts the unfiltered oil to a tilting, two-compartment tank, attached to a transverse pivot shaft and free to rock from side to side. As one of the compartments becomes filled, the tank overbalances to that side, and discharges its contents, causing a striker to ring a gong. At the same time the other tank compartment is brought under the oil stream. This action continues as long as the oil overflows from the clogged filter bags.





Left: The Small Rectangular Box, Connected with Pipes to the Left Side of the Oil-Filter Reservoir, Contains the Alarm Device Which Rings a Bell When the Filter Bags become Clogged and Overflow, Thus Warning the Engineer or the Attendant, That the Filter Bags Need Renewal or Cleaning. Above: Top and Side Views of Alarm Bells and Tilting Two-Compartment Tank

1950

Chicago daily news 11/29/23 p. 16.

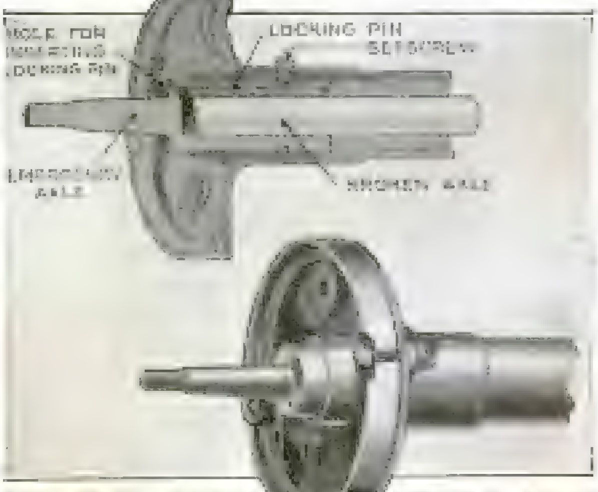
BRANCH OF YALE COLLEGE SUCCESSFUL IN CHINA

"The College of Yale in China," a branch of the American college of that name, now has an enrollment of more than 500 men. This school was founded in Changsha-Fu, the capital of the province of Hunan, in 1906, with 13 students. Since then, the Yale alumni have been most active in supporting the institution, financially and otherwise, and it has progressed steadily. It is said that its school of medicine is one of the largest and finest in China. All instruction is given in English.

1680

EMERGENCY DEVICE REPAIRS BROKEN AUTO AXLES

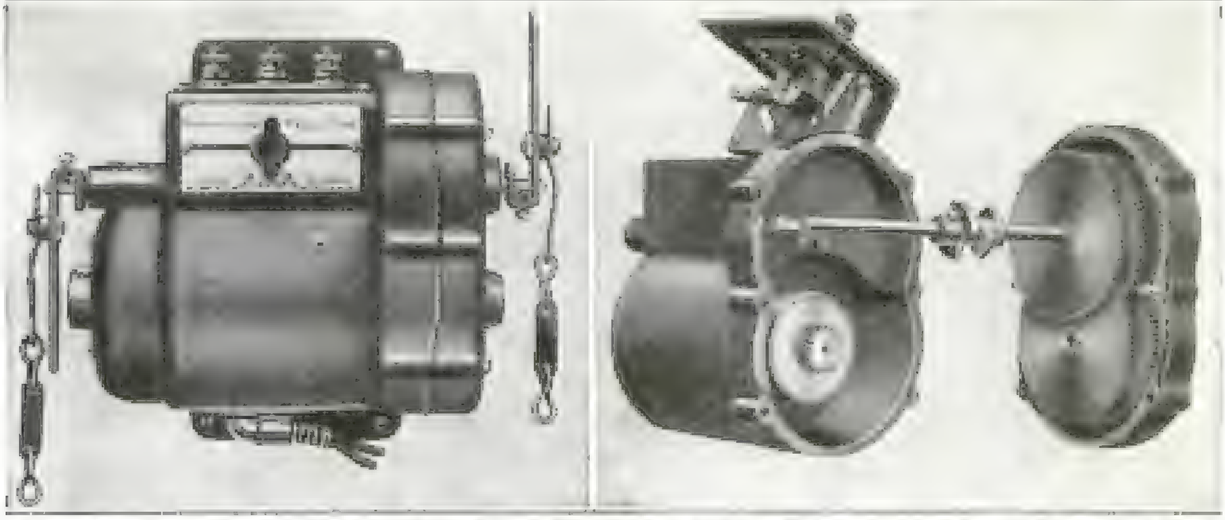
A simple device for making emergency repairs in the case of a broken car axle is now on the market. The device which can be carried in the tool kit and can be installed with a wrench, will enable the autoist to travel under his own power to some shop where permanent repairs can be made. It consists of a hardened steel bushing which is slid over the broken axle, to which it is held by a special locking pin and a setscrew. The bushing carries at its outer end a stub axle on which the wheel is mounted.



Above: Sectional View, Showing Broken Auto Axle Fitted with Emergency-Repair Device. Below: Side View of Repaired Axle

Hoeffler & Pritchard Co. ... St.
Milwaukee Wis.

1770 Honeywell Heating Specialties Co., Wabash Ind



Left: New Motor for Use with Temperature-Control Apparatus, Which has Transformer Built into It and Is Ready for Connection to Supply and Thermostat Circuits. Right: Gear-Case Cover Removed, Showing the "Figure-Eight" Reduction Gearing

NEW MOTOR FOR TEMPERATURE-CONTROL APPARATUS

A new motor adaptable to temperature-control apparatus, either in connection with thermostats for residence heating or for industrial purposes, is built integral with the transformer, and is provided with leads ready to connect to the supply circuit. It is inclosed in a dust-tight casing and provided with a pressure-oiling system that requires but little attention. It transmits energy through a train of "figure-eight" gears, to a crank with a lifting power equal to 100 pounds at 1 inch from the crank center.

NONCORRODIBLE COPPER CAST UNDER HOT WATER

Copper castings are rendered noncorrodible by casting the metal at high temperature under hot water, according to a method that probably originated in Japan, where it is widely practiced. Articles known to have been produced in this way, are unaffected after 35 years, due to the protective coat of cuprous oxide formed from the decomposition of the film of steam which separates the hot metal from the water during the casting operation.

PARKING LIGHT FOR AUTOS WORKS BY CLOCK

An interesting attachment for preventing collisions has been invented recently, and will be a boon to automobile owners who park their cars in front of their homes for the night. The device consists of a clock mechanism which is electrically connected to the parking lamp, and which can be set to turn on the light at any predetermined hour, as, for instance, when it is just getting dark. If the car is to be parked at the curb all night, the clock may be set to break the circuit to the light at any desired hour

A Sectional View of the Clock-Driven Mechanism for Automatically Switching On or Off the Parking Light

in the morning, whenever dawn is breaking. A master switch permits breaking the circuit at any other time, regardless of the clock.

¶Our Bureau of Information is for your benefit. Use it as often as you please.

Inv. William E. Winterling

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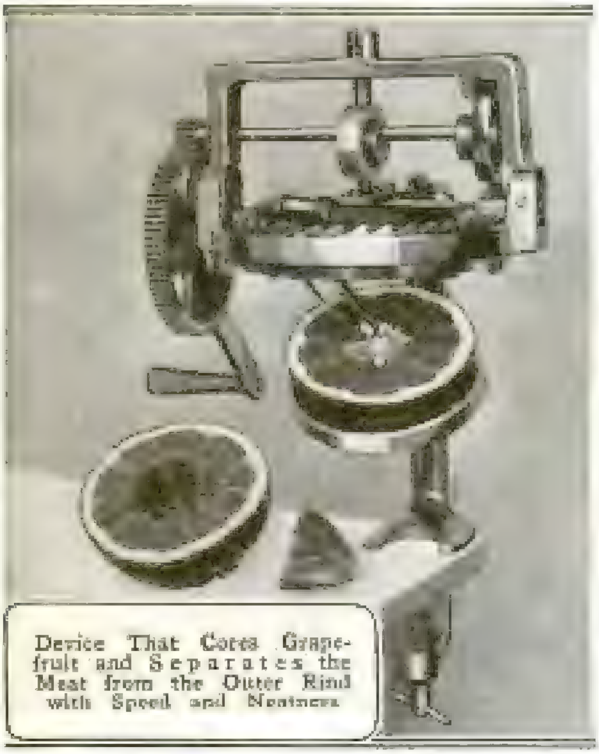
NEW DEVICE CUTS AND CORES GRAPEFRUIT

An interesting machine now ready for the market cores grapefruit and cuts it



Device That Cores Grapefruit and Separates the Meat from the Outer Rind with Speed and Neatness

from the outer rind. In the main, the machine consists of a pair of curved blades supported from a carrier hinged to an inner toothed ring, that gives the blades a combined up-and-down and rotary movement. The ring is in turn carried on an outer fixed ring, which also supports the driving mechanism. Below this is placed the half grapefruit in a cup-shaped holder, that is forced upward by a handle against a ring that fits the cut edge of the fruit. The machine is said to do neat, clean work about five times as fast as it can be done by hand.

HUNDREDS ANSWER INVITATION SENT VIA RADIO BY MAYOR

In dedicating a new broadcasting station in San Francisco recently, Mayor Rolph spoke into the transmitter as follows: "I want to find how far my voice is carrying—how big my audience is. Send in telegrams to me and send them collect. Come on, Mayor Hylan of New York, and you, Mayor Curley of Boston!" Responses came from every state in the Union, Honolulu, Canada, and from a ship 1,000 miles at sea. It was estimated that $3,000 worth of replies arrived within a very short time. Some of the more interesting ones were displayed in the window of a local telegraph company which handled the deluge of incoming messages.

ADJUSTABLE WINDOW SASHES FOR ANY WEATHER

A multiple-sash window, whose several sashes slide horizontally in the window frame, has been developed recently and will permit adjustment to suit any external weather conditions. Two or more sets of sashes may be mounted in the frame, of which one set may be provided with glass, and the others with wire screening, or Venetian blinds. In the winter all may be fitted with glass, insuring an absolutely weather-tight window for keeping the cold out. Horizontally grooved frames, invisible in the window wall, receive the flanged rollers with which each sash is provided; and the wall is recessed, of course, to receive those sashes which are not in use. The sides of the frame proper are also provided with a stop catch to limit the movement of each sash.

Multiple-Sash Window, Composed of Two or More Sets of Parallel Sliding Sashes Which can be Rolled Horizontally into the Wall

¶A moderate-priced automobile is now being introduced that has an air-cooled motor with copper cooling fins electrically welded to the iron cylinder casting. The advantage lies in the superior heat conductivity of copper, which is about nine times that of cast iron.

Copyrighted material

Simple Rig Devised by an Enterprising Farmer for Getting Heavy Stones Out of His Fields: One Pair of Horses, Pulling on a Rope around the Large Wooden Wheel, will Raise a Six to Eight-Ton Rock Out of the Ground

HOMEMADE DEVICE HANDLES HEAVY STONES

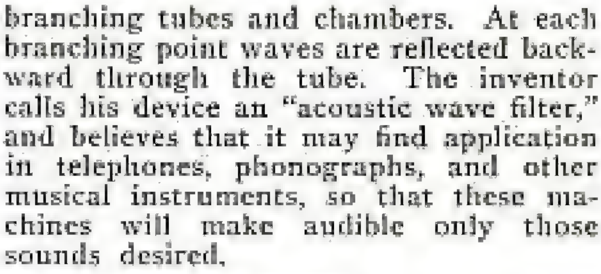
A resourceful farmer of the Northwest has rigged up for himself an odd-looking device which he uses to lift heavy stones out of the ground and to haul them out of the field. The device, which is mounted on a frame built up on four wagon wheels, consists of a 5-foot-diameter wheel attached to a piece of 6-inch well curbing, around which is wound the chain that grapples the rock. One pair of horses pulling on a 2-inch rope encircling the wheel, will lift out of the ground a 6 to 8-ton rock requiring four horses to haul. The load is held in the raised position by a lever-operated piece of timber that slides across the frame and locks with one of the crossarms of the wheel.

SOUND-WAVE "FILTER" MAY ELIMINATE NOISES

An unusually ingenious device has been invented by Prof. G. W. Stewart, of the University of Iowa, for suppressing, or eliminating entirely, undesirable sounds. Unlike previous attempts along these lines, Professor Stewart's principle is not to put obstructions in the path of the unwanted sound waves, but instead to cause successive sound waves to interfere with each other's transmission. Cylindrical tubes are used for this purpose, open at both ends and free from obstructions, but having, at regular intervals, branching tubes and chambers. At each branching point waves are reflected backward through the tube. The inventor calls his device an "acoustic wave filter," and believes that it may find application in telephones, phonographs, and other musical instruments, so that these machines will make audible only those sounds desired.

RATCHET SCREWDRIVER HAS PISTOL GRIP

An improved type of screwdriver has recently appeared on the market for handling large or stubborn screws with much greater ease than is possible with the ordinary straight-handled tool. A pistol grip is provided with this tool, which is of the ratchet type, enabling the operator to exert a powerful leverage even when the hands are wet or oily. In addition, it has the advantage of being able to take a series of interchangeable blades.



The Nonslipping Handle of This Pistol-Grip Screwdriver Prevents a Mechanic's Hands from Blistering. It Takes Several Blades

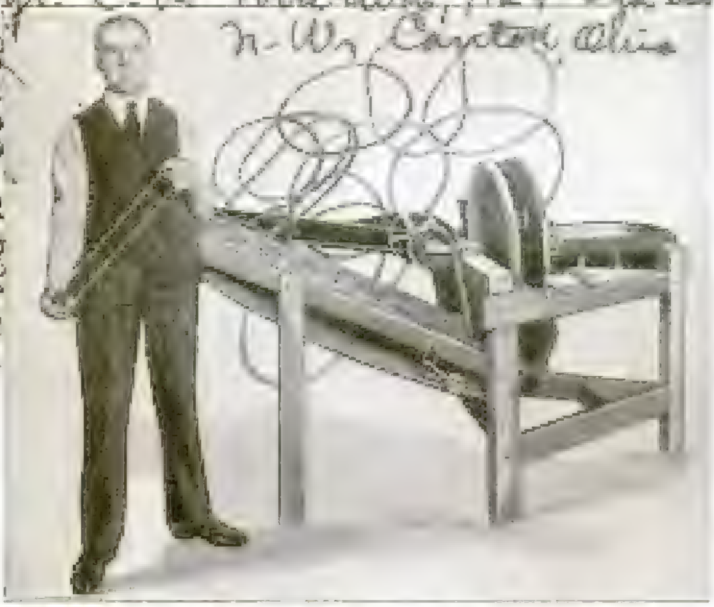
Inv. C. B. Martin c/o Joseph Dick Mfg Co Canton Ohio Manchester Guardian 1/18/23

MACHINE CUTS RUBBER BANDS FROM OLD INNER TUBES

1768

Inner tubes that have passed their usefulness as part of a pneumatic tire, are

Mr. C. B. Martin, 1129-6th St. N-W, Canton, Ohio



New Machine Which, by Means of a Special Saw, Converts Old Inner Tubes from Pneumatic Tires into Elastic Rubber Bands at the Rate of 20,000 an Hour

Industrial Products Co., 1325 W. Tuscarawas, Canton, Ohio

now being converted into elastic rubber bands by a man who has designed a machine for this purpose. In this machine the tube is automatically fed to a special saw that cuts off the bands at the rate of 20,000 an hour, and drops them on a conveyor. It is expected that the moderate price at which they can be offered will find the bands a ready market, as a substitute for wrapping twine, in many retail stores and in factories that put up merchandise in small packages.

TIRE DEFLATER LEAVES HANDS FREE FOR OTHER WORK

956

A simple device for deflating automobile tubes has been placed on the market recently which can be readily secured to the valve to keep it open when necessary. Only slight pressure is necessary to clamp the device to the valve stem, a small pin keeping the valve spring down and permitting air to escape from the tube. The hands are thus left free to do other work.

Autoprint Mfg. Co., Rochester, N.Y.

HYDRAULIC-DREDGING METHOD APPLIED TO PEAT DIGGING

1969

Excellent results were attained recently in the extraction of peat from the extensive bogs and moors of Finland by the use of water jets for tearing up the raw peat. By this method the resulting plastic mass is free from stumps, the presence of which makes hand digging so uneconomical. Two water jets, of from 225 to 300 pounds' pressure, are fed by a 330-gallon per minute pump, and cut up the outer layer of peat like knives. The resulting pulp is then further diluted, so that it can be pumped like water, in the meanwhile being thoroughly mixed by the blades of the pump at the rate of 4,000 cuts per minute. The stumps, which are laid bare and thoroughly cleaned by the action of the water, are cut to pieces with large shears attached to the pump cart, and then disposed of. In the drying yard, the thin peat pulp is allowed to settle in layers about 10 inches thick, the excess water evaporating.

ELECTRIC ALARM PROTECTS BANKS FROM HOLDUP

1391

Burglar-alarm equipment, for banks and similar institutions, is being provided in the form of an electric siren that can be sounded from any one of a number of different points. A central relay switch, to which the lighting circuit is connected, operates the siren whenever contact is made at a starting station. At each starting station is located a foot-operated push button, and at some convenient point a push button which stops the siren. The siren is operated by a universal electric motor, and the relay switch is independent of current for contact.

Inter State Machine Products Co., Rochester, N.Y.

1754 Cnt. Mrs. Ruth Darling Shultis, 1007 E. Porter St. Albion, Mich.

This View Shows the Suction Dredge in the Foreground, and the Flume, Supported on a Trestle, Which Carries the Pumped Gravel to the Storage Bins in the Background. Here the Gravel Is Screened, Sorted, and Stored for Shipment. To the Left of the Bins, a Bathhouse Is Visible

1754

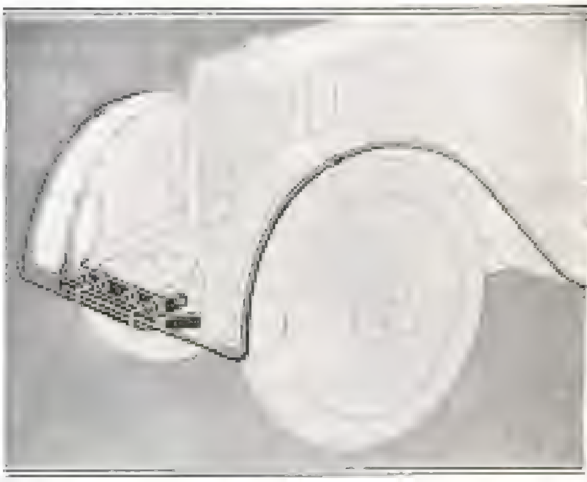
SUCTION DREDGE GETS GRAVEL FROM BATHING POND

For years the residents of Cowles, Neb., had been compelled to get all their building gravel from outlying districts, because of its scarcity locally. What little there was, was of poor quality, mixed with dirt and clay, and unfit for use. Quite by chance, an observing farmer discovered that there was a fine deposit of clean gravel in the bed of a near-by pond, which had been very popular for bathing purposes. At first this was uncovered in small quantities, but finally a suction dredge was installed to meet the rapidly growing demand. A dynamo on the bank of the pit furnishes power for the pump equipment, and is fitted with a flexible connection to permit the dredge out in the pond to shift its position readily. A flexible flume, with its mouth buried in the gravel at the bottom of the pond, is carried on a trestle, and conveys the pumped material to the bank.

"SAFETY-FIRST" GUARD RAIL ENVELOPS CAR

663

The ever-growing extension of automobile traffic, with its accompanying increase in automobile injuries and fatalities, has stimulated the invention of numerous appliances, designed to minimize the effects of collisions. One of the latest of these to appear on the market is an all-steel rail inclosure, about 1 or $1\frac{1}{2}$ inches in diameter, which completely envelops the car, following the fenders and running board. It is claimed for this attachment that, when resiliently braced against



A Spring-Steel Guard-Rail Inclosure Which is Attached to the Car Frame and is Designed to Absorb the Shock of a Collision

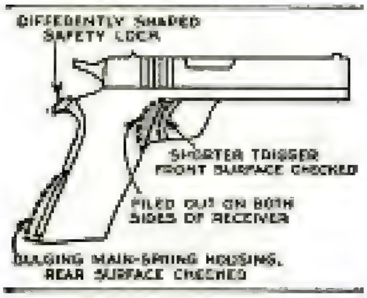
the sides of the car, it provides sufficient recoil against shock to prevent buckling of the chassis frame.

¶Real estate is being sold "over the counter" at a Chicago department store as part of its regular "merchandise." The practice is said to have long been customary in London department stores.

Chas A. Carr, 2080 E. 92nd, South Chicago

ARMY .45-CALIBER PISTOL MAY BE CHANGED

Interesting recommendations have gone forward recently from the U. S. Cavalry Board to the chief of cavalry governing modifications to be made in the regulation .45-caliber automatic pistol. One important change recommended is that the mainspring housing be bulged and checked, thus eliminating the tendency of the pistol to point low when held in the natural grasp. A shorter trigger is also recommended, because it reduces the distance from the back of the grip to the front of the trigger and therefore allows a man with a small hand to grasp the pistol more comfortably. It is also desired to change slightly the shape of the safety lock, so that it will not pinch the skin. Ten sample pistols, incorporating these changes, were tried out in pistol practice with uniformly satisfactory results. The changes can be made with but slight additional expense, and it is believed that they will make the automatic pistol an even more satisfactory weapon than it is at present. Definite action approving these modifications is expected shortly.

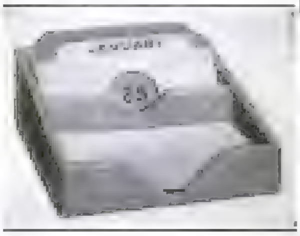


REDEEMABLE METAL TOKENS USED BY MILK COMPANY

The handling of paper tickets, at times a troublesome problem for both customer and dealer, has been solved by a western milk-distributing company by the use of aluminum tokens which are redeemable at their face value in milk. The paper tickets had several serious disadvantages, among which may be mentioned the annoyance of extracting them from empty bottles, the heavy cost of printing, and the expense involved in employing a staff solely for counting, checking, and destroying those turned in. Now the driver buys $100 worth of the metal checks, sells them to those desiring milk, and later uses the same ones over again.

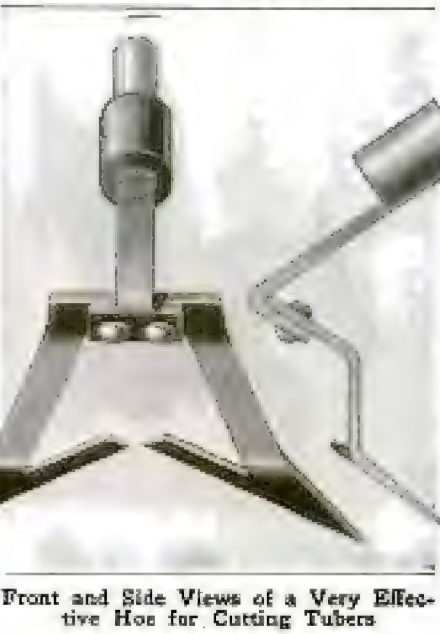
SIMPLE CARD INDEX INTENDED AS CALENDAR MEMO FILE

A simple desk-calendar memo file has been made with a card-index arrangement. A card designating the month is placed first in a small built-up tray, open in front, while through a hole in the card's center can be seen another card with the day of the month printed upon it. Behind these daily key cards are kept the plain memo cards.



DOUBLE-BLADED GARDEN HOE WITH SHARP EDGES

With the ordinary garden hoe, on account of the shape and bluntness of its single blade, considerable effort is required to force it into the ground, and it is not adapted for digging out weeds easily, or cutting off the stems of tuberous plants, such as potatoes. All these things can be readily done with a two-bladed hoe, recently patented, which has the blades extending outward from their connection to the handle and terminating in two sharp points. From these points the blades slope toward each other until they nearly meet, and are shaped like knife blades with sharp edges.



Front and Side Views of a Very Effective Hoe for Cutting Tubers

¶A French dealer in antiques is said to be in the habit of acquiring wood-boring worms with a taste for furniture. Some of these he feeds on his own new furniture to give it a more venerable appearance, while the rest are sold to other dealers. Formerly worm holes were simulated in cruder ways.

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no information on maker
1964

CHILDREN'S PICTURE-STORY DEPARTMENT

Hippodrome

A New Vehicle for the Kiddies Which is Propelled with a Motion Similar to Rowing, and is Steered with the Feet: It is Also Seen as an Exerciser for Some of the Mothers

Into the Jaws of Death: This London Zoo Keeper must Be on Pretty Friendly Terms with His Charge to Place Himself So Smilingly within the Maw of a Hippopotamus

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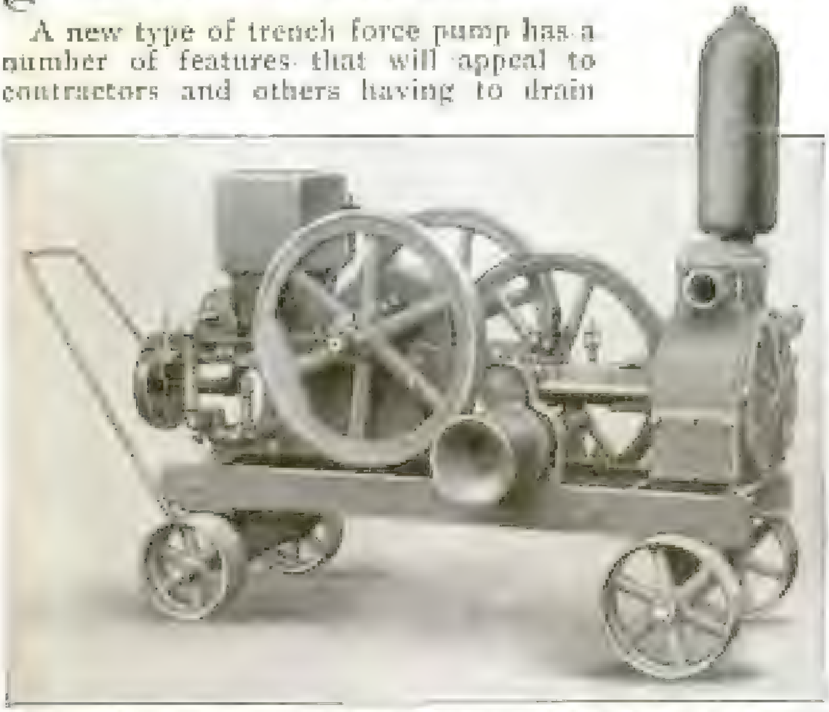
Major Clarence Howerton, Who Weighs Only 17 Pounds and Stands 18 Inches High, is Believed to Be the Smallest Adult in the World—and He is Attempting to Pull a Truck Load of Giants Whose Combined Weight Is About 1,000 Pounds. The Shortest Is 7 Feet 4 Inches Tall

To Madison Square Garden
New York City

NEW TRENCH FORCE PUMP HAS CONVENIENT FEATURES

A new type of trench force pump has a number of features that will appeal to contractors and others having to drain muddy and gritty water from sewers, ditches, and excavations. It will deliver water 10 to 80 feet above the pump, or through a hose or pipe from 100 to 1,000 feet long, and is fitted with an outside packed plunger as well as interchangeable poppet valves for suction and discharge. The unit consists of the pump and gasoline engine, or electric motor, mounted on a truck, and its usefulness is further increased by a winch head capable of a 500-pound pull.



Portable Unit, Consisting of Gasoline Engine and Force Pump for Handling Dirty Water: The Pump Has an Outside Packed Plunger, and Interchangeable Poppet Valves for Suction and Discharge

¶ Night air service between London and Paris, with planes leaving each city at 6:30 p.m., is now being undertaken as an experiment. Ground lights every 30 miles and colored signals from the airplanes are planned.

COMB ON BARBER'S SHEARS INTENDED FOR HOME USE

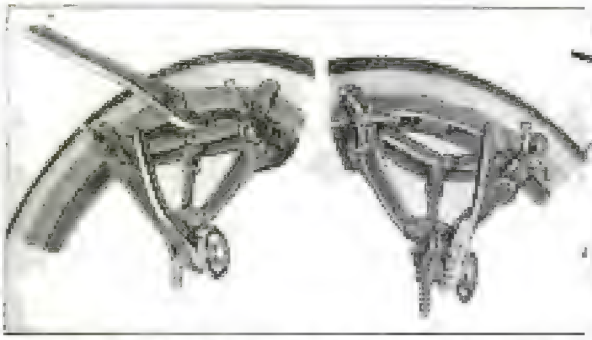
Another device intended to make hair trimming at home easier has recently been patented. It is an ordinary pair of barber's shears with a holder of metal, attached to the underside. A comb is slipped into this holder, and the operator proceeds with the work much in the manner of a person using a pair of clippers. The comb is readily removed for the purpose of cleaning.

Hair-Cutting Device for Home Use Which Consists of a Pair of Barber's Shears with a Comb Holder Attached to the Underside

¶ Our Bureau of Information will answer all questions regarding articles appearing in this magazine.

NEW TIRE-RIM REMOVER UNUSUALLY POWERFUL

A newly invented device for contracting rims to remove them from a tire requires much less power in using than other similar tools. Two strong jaws, opened and closed with bolts and wing nuts, grasp the rim on each side of the joint. The alinement of the ends is broken with a specially designed lever. Then, by working a ratchet, a screw shaft is rotated, which operation pulls the jaws together, contracting the rim till it lifts off the tire. It is said a tire can be removed and replaced in about two minutes.



Device for Removing Split Rims, Shown at the Right When First Applied, and at the Left with the Rim Ends Out of Line

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All Shop Notes published in 1922, in book form—Fifty Cents—from our Book Department.

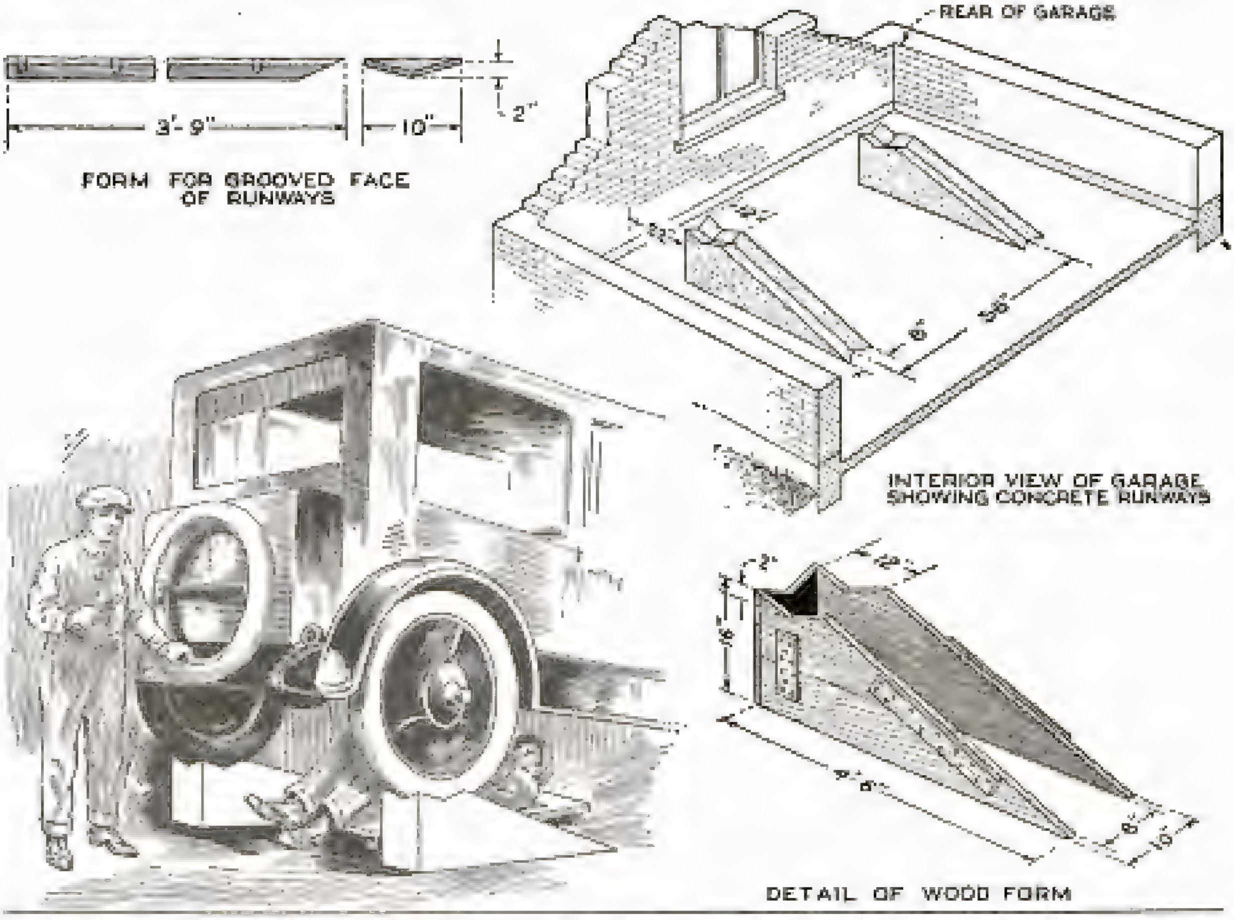
Concrete Runways Aid Car Repairs

By GEORGE A. LUERS

THE runways shown in the illustration will prove of great convenience in any garage or repair shop, public or private; they are far easier to make than pits, and can be built in a few hours.

A simple wooden form is made as shown in the lower right-hand corner; only one form is necessary, although two will speed the work. When the location of the runways has been decided upon, excavations are made, about 2 ft. deep and a little shorter in length and width than the form, to allow it to rest on the edges of the hole. If there is a cement floor in the garage, it will be sufficient to chip it out to the dimensions of the inside of the form and about 1½ or 2 in. deep, and to wet the rough chipped surface thoroughly, to allow the new concrete to bond with the old.

The main form being set in place, the V-shaped form for the grooved runway is set on top of it, and clamped in place by using C-clamps on the battens on the side of the main form; a mixture composed of 1 part portland cement to 2



Easily Made Concrete Runways That Take the Place of a Pit in the Public Garage or Repair Shop, and Are Also Suitable for the Private Garage: The Dimensions Given Are Suitable for All Standard Cars. The Runways may be Placed Anywhere Convenient, Although Preferably Opposite a Window, to Provide Plenty of Natural Light

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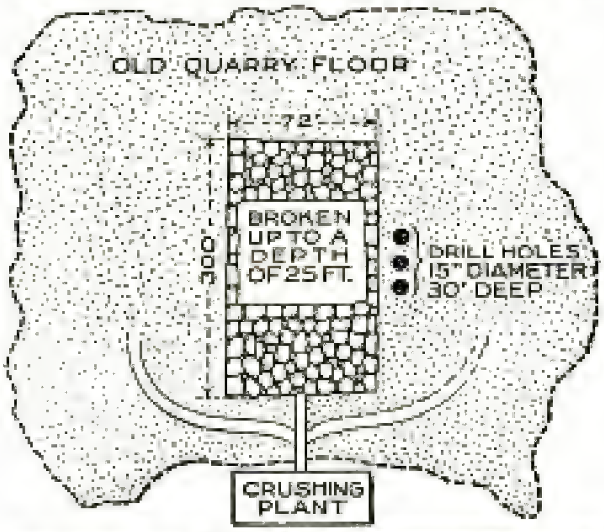
parts sand is poured in, and thoroughly tamped with a long iron rod, poking all corners well, to insure that there will be no pockets or unfilled places.

The depression in the top of the runway that holds the car wheel is formed with a trowel or similar tool, while the concrete is still soft, and the form is allowed to remain for at least 24 hours, when it may be removed and used for the other runway. The runways should be kept thoroughly wet for about 10 days, when they may be put in service. The car is simply driven up the runways slowly, under its own power, the depressions in the tops preventing it from being driven over the back.

The dimensions shown will be suitable for most cars, and the runways should be 56 in. center to center. They should be set near a window, to provide sufficient natural light, and far enough from the wall so that the work on the car can be performed with comfort.

New Method of Lowering Quarry Floor

The lowering of a quarry floor is usually a most laborious operation. The original quarry is generally cut to about the ground-water level, and, in making a new cut below this level, the common method is to blast out a small hole, remove the stone with a clamshell, or by some other method that is just as tedious, and then pump the water out. After that a shovel is let down into the hole, and the hole is enlarged to a proper working face.



A Time and Labor-Saving Method of Lowering a Quarry Floor to a Depth of 25 Feet below the Original Floor, by Blasting a Large Area

A new method, recently employed in an Ohio quarry, is to drill a large area with blast-hole drills, as in opening a new quarry. The entire area is shot at once with heavy charges, to break up the rock as much as possible. In this case an area, 300 by 72 ft. in size, was drilled and broken to a depth of about 25 ft. Holes, 15 in. in diameter, were then drilled close to the edge of the broken-up area, to a depth of about 30 ft. These holes, of course, were driven through broken and shattered rock, and were lined with old screen plates. Suction intakes were let down into the drill holes, and the entire area was pumped out. A steam shovel was then set to work at the edge of the blasted area, and worked right down to the new level.

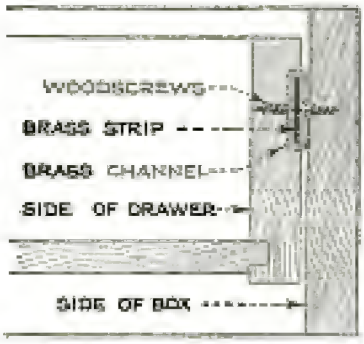
Internal Limit Gauge

While internal limit gauges, for determining the minimum and maximum allowable sizes of holes, are usually marked to distinguish the "go" and the "not-go" ends, the figures or letters are quite small, and they must be read each time so that the proper end may be used.

To eliminate this trouble, we knurled all our gauges on the "not-go" end, so that the inspector would know, by feel, which end he was using.—J. H. Moore, Toronto, Can.

Slide for Tool-Chest Drawers

There are several types of slides used for tool-chest drawers, but the one illustrated is novel and will be appreciated by woodworkers. The slide is metal, and is used on a tool box having an open front, similar to a machinist's tool chest. A brass channel is screwed to each side of the drawers, and brass strips, an easy fit in the channels, are fastened to the sides of the box, as indicated. The metal slides have a long life, do not warp nor permit the drawers to rub against each other, and support the drawers firmly when the latter are drawn almost all the way out.



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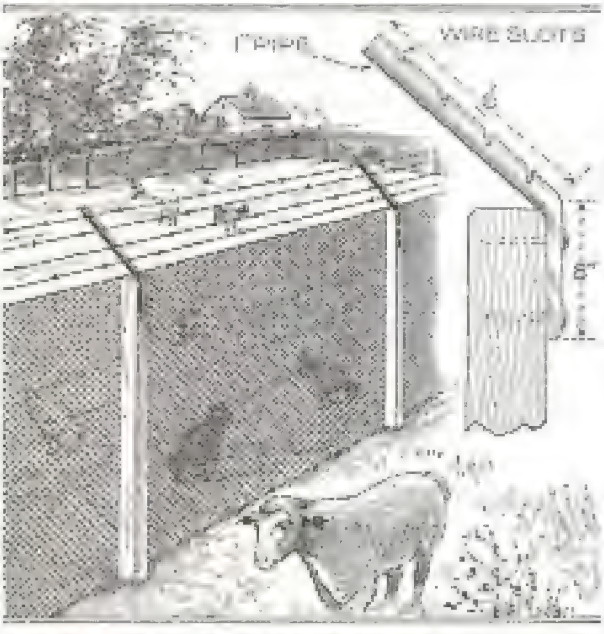
Fence-Post Attachment Made of Pipe

When it is desired to run a slanting wire fence on the top of the poultry fence, wooden slats, nailed to the fence posts, are generally used to support the wire; these, however, are not as a rule satisfactory, as they are neither as strong as they should be, nor do they last as long as desired.

A better and more substantial type of support can be made from 2-ft. lengths of pipe, flattened on one end for a distance of 8 in. and bent to a 45° angle as shown. The upper portion is slotted with a heavy hacksaw blade, for the reception of the barbed wire, and the flattened portion is nailed to the outside of the fence post with long spikes. Paint, applied both internally and externally by dipping, will keep the pipe from rusting.

After the wire has been pushed into the slot, and has been pulled up tightly, a blow with a light hammer on the edge of the slot will clinch the wire. This arrangement is the simplest and most effective way of fastening the wire to the pipe.—J. V. Romig, Allentown, Pa.



A Slanting Fence Top That Keeps the Poultry in the Yard; The Supports for the Barbed Wire are Made of Pipe

Truck Attachment for Handling Armatures

It is usually a difficult and time-consuming task to move heavy armatures, as they must be handled with great care in order to avoid damaging the winding, commutator, or the shaft. A couple of iron arms, attached to an ordinary two-wheel hand truck, have been found to facilitate this work greatly. The arms are bent as shown, faced with sheet lead, and bolted to the truck in place of the regular bracket. Armatures up to 15 and 20 in. in diameter, or other machine parts mounted on shafts, can readily be handled by one man on a truck of this type, providing, of course, the length does not exceed the distance between the arms.—Chas. J. Le Compte, St. Louis, Mo.

Attachment for Hand Truck That Facilitates the Handling of Armatures: With It One Man can Handle an Armature That Ordinarily would Require Two Men

Rack for Drying Blueprints

Drying blueprints on a rack, as shown in the drawing, is a considerable improvement on the usual method of drying them over a line. A triangular frame of wood is built, as shown, the wooden crosspieces having a number of small spikes driven through them so as to project about ½ in. in front. The crosspieces are set far enough away from each other to allow a good circulation of air around the wet prints, when they are hung on the points to dry. A pan underneath catches the water dripping from the prints.

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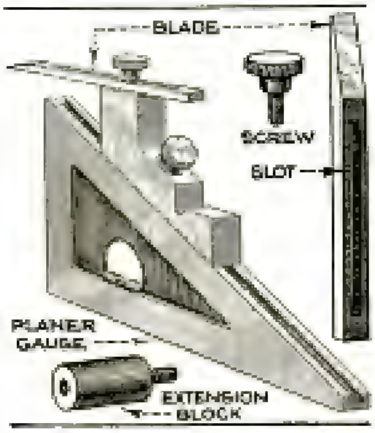
Height Gauge Made from Planer Gauge

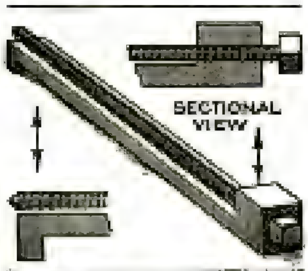
The addition of a blade to the common planer gauge provides the mechanic with a very satisfactory height gauge. The blade is made of tool steel, ground to a knife edge, as shown, slotted, hardened, and tempered, and the bottom surface ground true. The knurled screw that fastens it to the gauge has a thread of the same size as the regular extension blocks for the gauge. The gauge is set, in the usual manner, with an outside micrometer, and the blade then clamped in place. With the use of the extension blocks, the gauge has quite a wide range of adjustment.—G. W. Nusbaum, Takoma Park, D. C.



Extractor for Locomotive Brasses

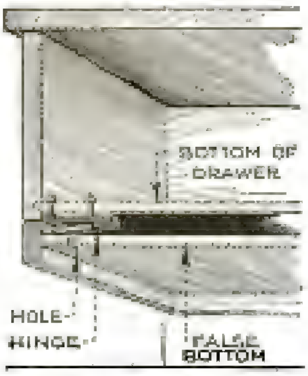
Many railroads are compelled to maintain small repair shops at outlying points to take care of engines running on branches, or shifting at junction points, and, as these shops are not usually fully equipped, many ingenious labor-saving devices are devised in the shops themselves.

One place, not equipped with a drop pit, was experiencing considerable trouble in removing journal bearings from engine-truck and trailer-truck boxes, as these were slid into the box from the center of the engine, and it was extremely difficult to obtain any hold on the bearing when in place in the box, even after the "sponging cellar" was removed. The extractor illustrated was found to lessen the trouble considerably. After removing the sponging cellar, the engine is jacked up, and a chisel inserted between the crown of the brass and the box. An opening is thus made into which the extractor is thrust, far enough for the lip on the end to catch the inner side of the brass. Then, by using a wrench on the square head of the long screw, the bearing can easily be withdrawn from the box. With a bearing that has run hot enough to melt the babbitt, and where the latter has run down over the axle and cooled, this has proved to be about the only method of replacing the bearings without dropping the wheels, a practice that is not always applicable in small repair shops.—C. A. Sprout, Lancaster, Pa.



Trick Lock for Workbench Drawer

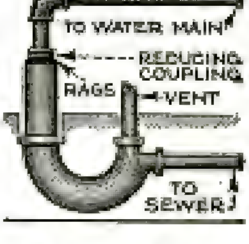
A trick lock for the workbench drawer is shown in the drawing. An ordinary butt hinge, with one leaf fastened to the underside of the drawer, as indicated, so that the loose leaf will drop down of itself, is all that is necessary. A false bottom is nailed under the drawer to conceal the hinge. A small hole is drilled in this bottom, directly under the hinge, so that the movable leaf can be pushed up with a pencil, or with the finger, to permit it to be passed over the lower edge of the drawer opening in the bench. When the drawer is closed, the leaf drops down, and prevents the drawer from being opened by anyone not acquainted with the secret.



Flushing Sewer by Water Pressure

When a sewer becomes clogged with lint, as is often the case in laundries, it is quite a problem to clean it out thoroughly and quickly.

It has been found that water under pressure is about as good a means of flushing the sewer as any. The water main is connected to the sewer above the trap, as shown. The connection is, of course, made as tight as possible, so that it will be waterproof and stand considerable pressure without blowing out. A good method of connecting is to use a coupling that will fit inside the sewer pipe, at one end, and reduced at the other to



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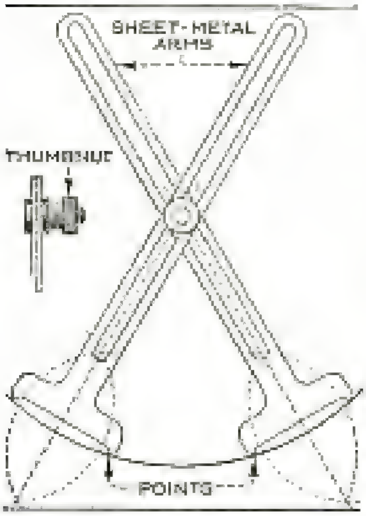
2 in., and to stuff the space between coupling and pipe with rags. Then, by wedging and bracing the coupling in place with a few heavy pieces of lumber, the connection is made secure. A 2-in. pipe is then connected from the coupling to the water main.

Water, under pressure of about 60 lb., is then turned on, and the obstruction will be forced away. By employing this means, the expense and time of digging up the sewer are eliminated.

Radius-Finding Tool

The tool shown in the illustration will be found very useful to machinists, patternmakers, and others. With it the diameters of broken gear wheels, pulleys, and other parts, of which only a portion of the rim remains, can be found, or the radius of any arc determined. It consists of two arms, cut from sheet metal to the shape shown, and slotted along their centers, to fit a small clamping screw with a flat head. Two points are filed on the end of each arm, as indicated in the drawing, on a line square with the centers of the arms. When in use, the four points are brought into contact with the curve or arc, and the nut tightened. The flat head of the screw has a fine mark in the center, and measurements may be made with a pair of dividers from this mark to one of the points. A wide range of radii is covered with this tool.

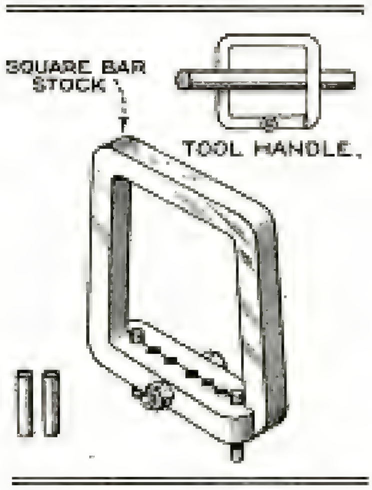


Cementing Gasoline-Line Couplings

While working on gasoline equipment, such as stove burners, one will often find a union or coupling that leaks, no matter how much white lead or other compound is applied. It has been found that if the ends to be connected are given a liberal application of ordinary liquid glue, tightened, and allowed to dry, the joint will be permanently leak-proof.

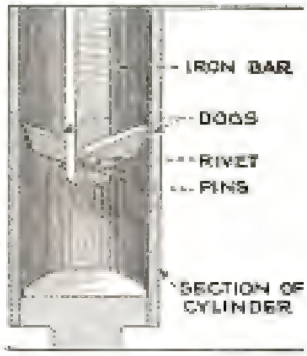
Novel Spanner Wrench

The illustration shows a spanner wrench that can be used on a large variety of work. It is made of bar stock, bent to the shape indicated, with the ends overlapping for the length of one side. A number of grooves are filed between these ends, as shown, to allow the insertion of small pins. A bolt or screw passing through the center of both ends enables the pins to be clamped in position. By having the grooves cut uneven distances apart, almost any desired spacing can be obtained. If necessary, a handle can be passed through the wrench to obtain greater leverage.



Pulling Pump Cylinders

The tool illustrated was improvised to pull up a pump cylinder that had fallen to the bottom of a well, and was found very satisfactory. It consists of an iron bar, to one end of which two iron dogs are loosely pivoted, as shown, on a rivet extending through both dogs and the bar. Small pins are driven into holes drilled in the bar, below the dogs, to keep them from falling below a horizontal position. Both dogs are pointed at the end, as indicated, and, when horizontal, measure a little more across than the inside diameter of the cylinder. The bar is threaded at the upper end, a length of ¾-in. pipe screwed onto it, and the device lowered into the well, additional lengths of pipe being screwed on, until the bar strikes the bottom of the cylinder. Upon pulling up on the pipe, the dogs dig into the wall of the cylinder and allow it to be lifted with ease.—Ed. Henderson, Lake Mills, Ia.



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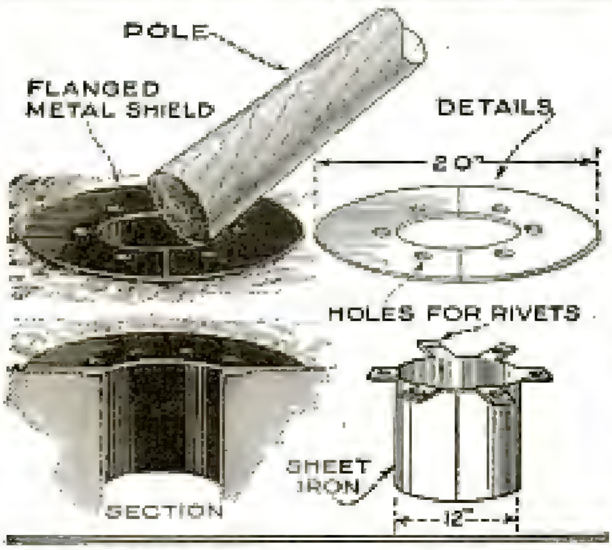
Shield for Post Holes

When setting up large posts or poles, a considerable quantity of dirt is usually pushed into the hole by the end of the pole, and this very often must be removed in order to sink the pole to the proper depth. To eliminate this difficulty a sheet-iron shield for the hole has been found very useful.



A Metal Shield That Prevents Dirt from being Pushed into the Hole When Setting Up Large Posts or Poles

The shield consists of two semicircular lengths of sheet iron, to which a split flange is riveted, as shown at the right. The exact dimensions of these parts, of course, depend on the diameter of the poles, although the dimensions given in the drawing will serve in most cases. The guard is inserted in the hole as indicated, and can easily be removed after the pole has been set in place.

Tool Holds Auto-Cylinder Blocks for Preheating

An Indianapolis welder uses the simple but ingenious tool shown for handling automobile-cylinder blocks in a preheating furnace. It is usually necessary, when preheating the blocks, to turn them over often, and this tool reduces the labor required to the minimum.

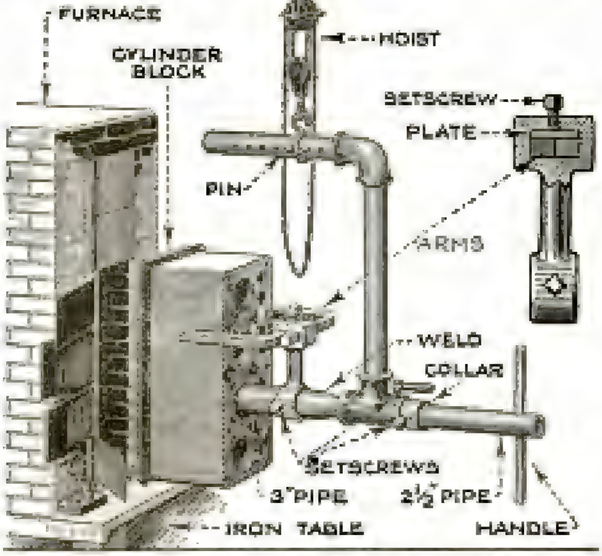
The apparatus consists of a short piece of 3-in. pipe, welded to a long piece of 2½-in. pipe, which is drilled for a cross handle. A tee, which is a sliding fit on the 2½-in. pipe, is fitted with a smaller pipe, and this, in turn, with an elbow and horizontal pipe which has a hoist hook on it, to allow the assembly to be suspended from a crane.

The 3-in. pipe is fitted with a casting, as shown, which is fastened solidly to the pipe by setscrews, and which carries two arms, made of 1-in. square steel, bent at right angles, and held in a slot in the casting by means of a setscrew and plate, as shown in the sectional detail. These arms straddle the cylinder block, and support it, when the 3-in. pipe is thrust into the cylinder, and permit the cylinder to be manipulated in any manner that may be desired.

The crane used has a track running over the furnace, and the hoist can be swiveled so as to bring the block to any desired position.

The furnace used is of firebrick, built on an iron table, and is provided with doors, about 6 in. deep, swinging on a vertical rod which is welded to a clamp and fastened to the table. There are six doors, so that a six-cylinder block can be handled if necessary.

If a four-cylinder block is in the furnace, and it is necessary to turn it, the procedure is as follows: Four of the doors are opened, the remainder being kept shut, to conserve heat as much as possible; the 3-in. pipe is then thrust into a cylinder, with the arms straddling the block. The block is hoisted enough to enable it to be withdrawn, the setscrew on the tee is loosened, the block turned by means of the handle, the screw tightened, and the block replaced. There is no heavy lifting, no loss of time, and no waste of heat.—L. C. Land, Greenfield, Indiana.



Simple Rigging Used for Handling Automobile-Cylinder Blocks When Placing Them in a Preheating Furnace, or Removing Them for Welding

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Building a Small Horizontal Steam Engine

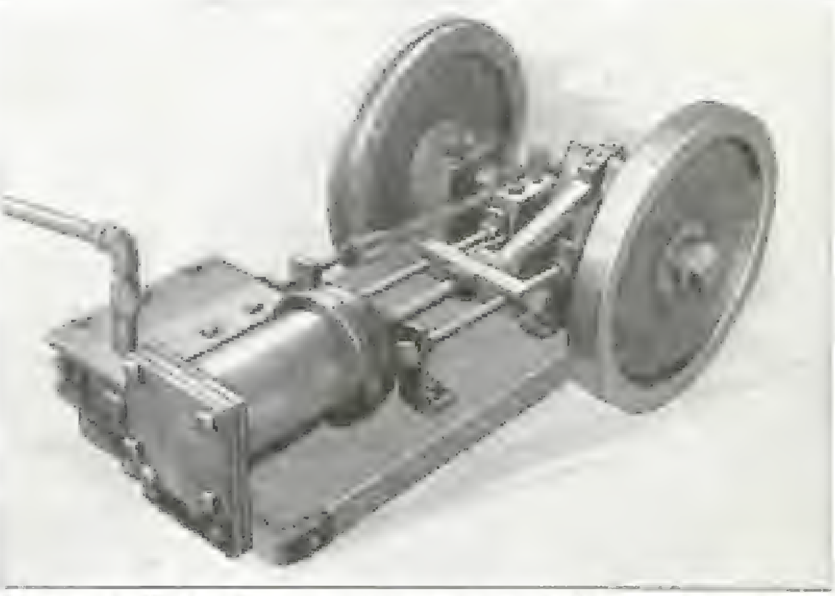
BY HAROLD E. BENSON

THE small engine described in this article was built by the writer in his spare time—about an hour a day for four months—and drives the machinery in a small shop. At 40-lb. gauge pressure, the engine runs at 150 r.p.m., under full load, and delivers a little over .4 brake horsepower. A cast steam chest, with larger and more direct steam ports, to reduce condensation losses; less clearance in the cylinder ends, and larger bearing surfaces in several places, would bring the efficiency of the engine up to a much higher point than this. In the writer's case, however, the engine is delivering ample power for the purpose to which it is applied, and consequently these changes were not made, but, if the engine is to be used for continuous rather than intermittent service, it would be foolish to waste power costing more than the changes needed to conserve it.

It might be remarked, at this point, that no method of construction described here is to be taken as the best; many better methods of making each part will doubtless occur to the reader. Some improvements that were thought of too late to be incorporated in the engine will be mentioned in the proper place.

The cylinder, shown in Fig. 1, is made from a piece of steel pipe, selected with special regard to the condition of the inner surface. This may be bored to size, and lapped, or ground. A standard inside diameter will make the fitting of a standard auto-engine piston ring easy. The ends are threaded on the lathe, standard pipe-thread size, while supported on two conical hardwood blocks, held on a threaded mandrel, and drawn firmly into the cylinder ends with nuts and washers. The standard mandrels for this purpose, if available, are more convenient. The rectangular plate A, that supports the rear end of the cylinder, is also bored and threaded on the lathe, using a four-jaw independent chuck to hold it. This plate, the rear cylinder head, and a copper gasket are clamped together, and the similar holes in each all drilled at one time.

The front cylinder head is a pipe cap, the exterior of which is turned to present a more pleasing appearance, and drilled and threaded to receive the stuffing box, Fig. 2. The distance between the edge of the front-end steam port and the inner side of the cap, when screwed home, should be much less than that shown, not over 1/4 in., for efficiency, and the same at the rear end. When the cap has been permanently screwed on the cylinder, one side is flattened, as shown, on the shaper or grinder, and the steam ports laid out and drilled. It would be a decided advantage to make these ports as much larger than given as is possible, as the efficiency with 1/2-in. ports is far below what it might be.



View of the Engine Complete, Ready to be Mounted on the Bed and to be Connected to the Steam Line: The Total Cost of Building Was $15.40: This may be Considerably Reduced by Following Closely the Directions Given

To make the stuffing box, a length of 2-in. cast-iron rod is drilled to fit the piston rod, then turned out at the front, recessed to a width of 5/8 in. for the packing, and threaded to fit the gland nut. The piece is then reversed in the lathe, and the outside threaded to fit the cylinder. After cutting off, the wrench flats are ground on the shoulder. The gland nut is made of brass-bar stock, threaded to fit the stuffing box, and the hexagon ground on it. When the parts are assembled, with the packing in place, the piston and rod should work smoothly, but stiffly, in stuffing box and cylinder, and be almost immovable when the ports are closed.

The piston is made of cast iron, and undercut to reduce the weight, as in Fig.

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3. The groove is turned to suit a standard 3/16 by 3-in. piston ring. The piston rod, which is of steel, must be fitted to the piston with great care, to insure their being exactly square with each other. If the face of the piston is square with the edge, the inner nut on the rod faced off square in the lathe, while on the rod, and the piston and locknuts then put on and tightened, no difficulty should be experienced.

The steam chest, shown in Figs. 4 to 7, is the hardest part of the engine to make. In this case, it is built up, using a square bar for the port block, an angle piece for the bottom and side, two endpieces, and a cover.

The port block, Fig. 5, is made of soft steel, the ports being drilled in as indicated by the dotted lines, from the ends and front, so as to provide a continuous passage for the steam. The exhaust port is drilled in from the front and bottom faces. The endpieces of the steam chest are held in place by short 1/2-in. capscrews, tapped into, and closing, the holes in the ends of the port block, and by long 5/16-in. bolts connecting the outer edges. The stuffing box on the front endpiece, Fig. 7, is made by brazing a blank nut to it, and making a snug-fitting gland for it, as shown in Fig. 8. The gland is drilled a neat fit for the valve rod, and for the 1/4-in. bolts that draw it into the stuffing box against the packing.

All parts of the steam chest are ground flat and smooth before assembling, and, when chest and cylinder are completed, are brazed together, all joints, the exhaust pipe, and the supports being brazed at the same time. When brazing, the steam ports should be plugged from inside the cylinder, to prevent any spelter from flowing into and closing them. The steam-chest cover is not brazed on, but is held by 1/4 by 3/4-in. screws, entering the port block, and by long bolts at the outer edge, passing through a heavy strip of iron below the chest. Packing is used on the steam-chest cover joint.

The slide valve, Fig. 9, is cut from a block of soft steel, or cast iron, the opening in the face being cut as deeply as possible, drilling the center hole first, and plugging it to obtain centers for the drilling of the outer holes. If the steam ports are enlarged, the dimensions of the valve must be changed; the new dimensions can be found by making a full-size layout of the ports and valve, or by making cardboard models of steam chest, valve, and ports, and adjusting these until the correct dimensions are obtained.

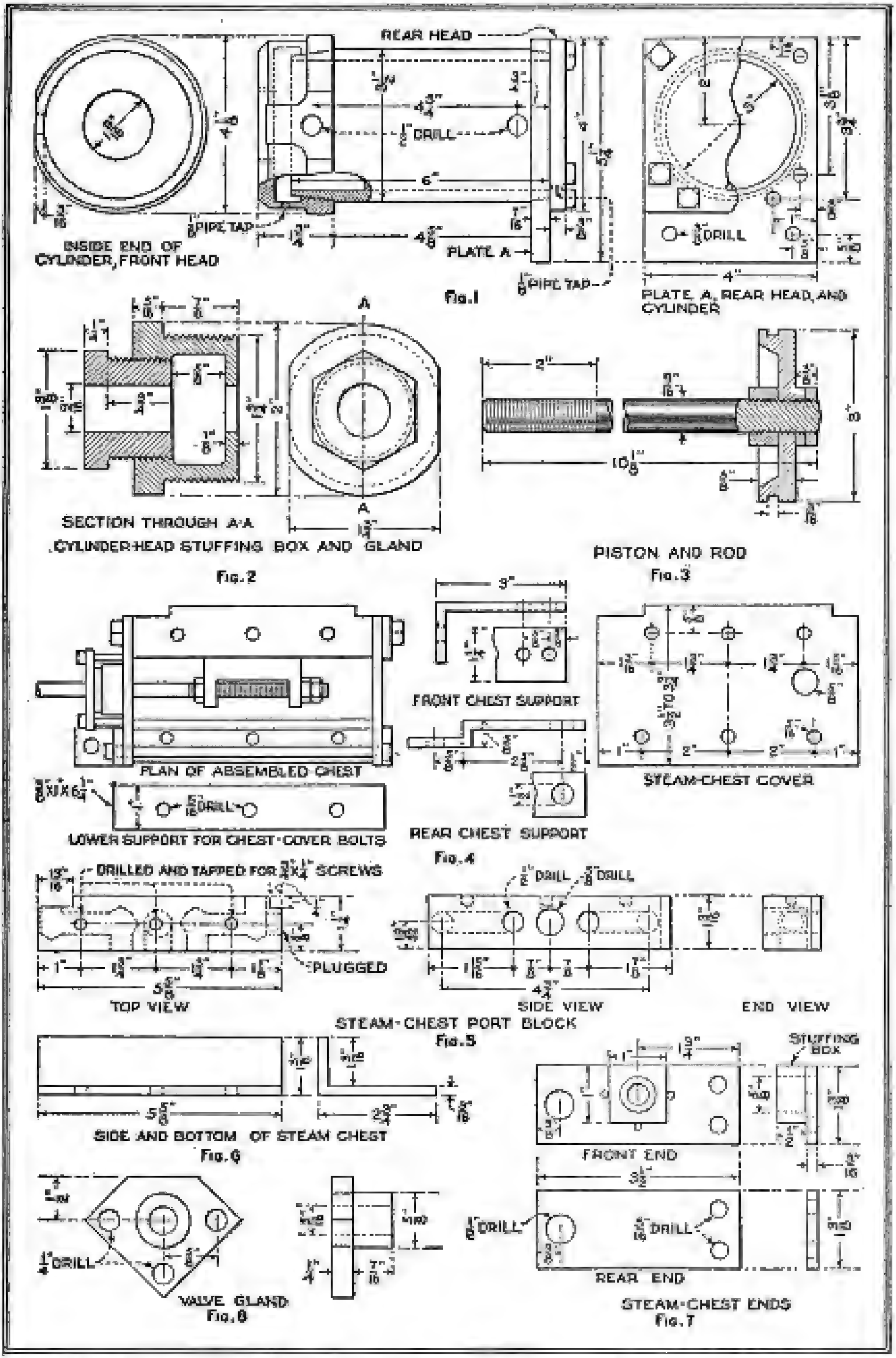
There is room for considerable experiment on the valve; any textbook on steam engines will provide suggestions for adding lap to the valve, to cut off the steam before the end of the stroke, and since it is comparatively easy to make this part, it is well to fit the valve to the engine after the latter is complete.

The crosshead and guides, shown in Figs. 12 and 13, are simple in construction. If a shaper or planer is available, a better construction may be made by following any of the designs seen on large engines. Oil cups on each bearing will furnish sufficient lubrication.

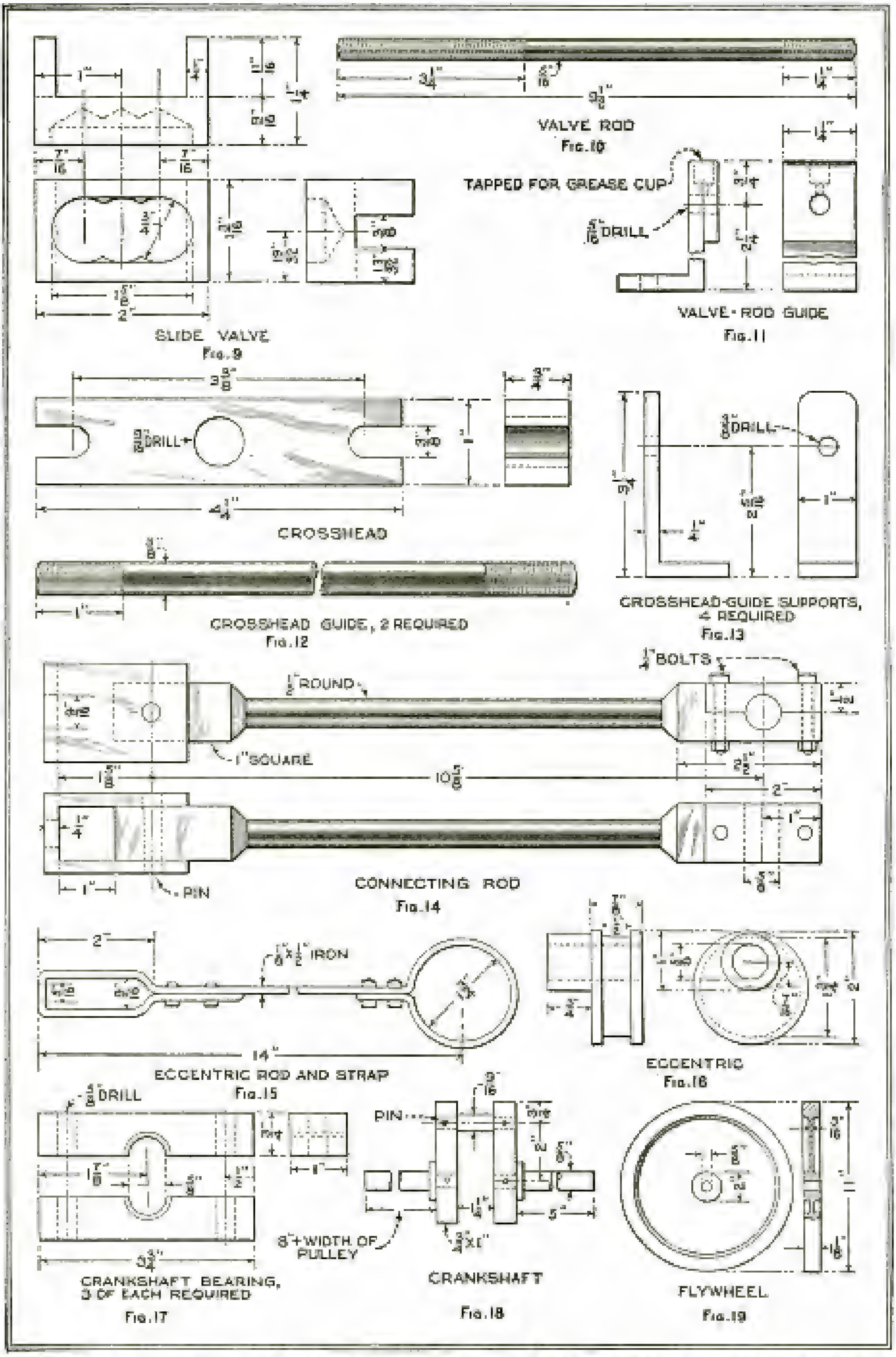
The connecting rod, Fig. 14, is made of 1-in. square stock, turned to a diameter of 1/2 in. in the center. The "big end" is drilled larger than the crankpin, and then sawed as indicated, so that the upper piece may be removed. Bolt holes are drilled through both pieces. When the engine is assembled, shims are placed between the halves of the big end, and babbitt poured through the oil-cup hole, around the crankpin, using putty dams on each side of the bearing. Small holes are drilled in the walls of the crankpin-bearing seat, before babbitting, to anchor the babbitt in place. The other end of the rod is fitted with a yoke and wristpin, as indicated, the diameter of the pin being made as large as possible, and run in babbitt bearings. Large-engine practice may be followed here, if desired; in fact, it will pay to study the details of large units, and to follow them as closely as possible everywhere, remembering that this description does not pretend to show the best practice, but only how the job may be done with material at hand.

The eccentric is turned from round stock, 2 in. in diameter, cutting the sheave first, then changing centers to turn the boss. The latter should be left long enough to enable it to be held in a chuck for drilling, after which it may be cut to length; the boss may be fitted so as to bear against the outboard crankshaft bearing, to prevent side motion of the crankshaft, instead of using collars.

The eccentric rod and strap are made of a length of 1/8 by 1/2-in. flat iron, as shown in Fig. 15. The valve-rod end should be fitted with a wristpin and yoke as on the connecting rod, instead of the construction indicated, which is only shown to give the dimensions. The strap that fits the groove in the eccentric is lapped to a smooth bearing surface by clamping it round a mandrel covered with fine emery and oil, and grinding until the strap fits the eccentric sheave perfectly.



Figures 1 to 3, Complete Details of the Cylinder, Stuffing Box and Gland, Piston and Piston Rod; Figures 4 to 7 Show the Component Parts of the Steam Chest, as Built Up, and an Assembly View of the Finished Steam Chest, without the Cover; Note Carefully the Method of Drilling the Steam Ports in the Block Shown in Figure 5, and the Position of the Various Parts in the Assembly View



Figures 9 to 11, Details of the Slide Valve, Valve Rod, and Guide, Showing How Opening is Drilled in Valve; Figures 12 and 13, Crosshead, Crosshead Guides, and Crosshead-Guide Supports; Figure 14, Detail of Connecting Rod; Figures 15 and 16, Eccentric Rod and Strap, and Eccentric Sheave; Figures 17 and 18, Crankshaft Bearings and Crankshaft; Figure 19, Side View and Part Section of Flywheel

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The crankshaft may be made in two ways. It may be built up as shown in Fig. 18, the ends of the shaft and the crankpin being threaded, or shouldered and pressed into the webs, and pinned. This method requires great care and accuracy, to keep the shaft ends and pin square. The shaft may also be turned from a solid bar of steel, turning the crankpin first, then moving the centers and turning the main shaft. This method makes a fine crankshaft. After turning the crankpin, the space between the webs must be blocked firmly with a piece of metal or hardwood, to prevent the webs from being sprung in when turning the main shaft.

To set the valve, the crank is put on the forward dead center, and the eccentric set 90° ahead of it, then locked. The eccentric may be led or advanced a few degrees after the engine has been running, if necessary.

The flywheels are cast slightly larger than the size shown, then turned down on the lathe until of the proper weight. This will depend upon the speed of the engine, the load, and other factors; the flywheels on the writer's engine weigh 10 lb. each, and it will be noticed that as much of the weight as possible is concentrated in the rim, the web being made as thin as practicable. The wheels are keyed to the shaft, the keyseats being cut by holding the shaft stationary in the lathe, while running the cutting tool horizontally by means of the carriage feed, and feeding the tool with the cross feed.

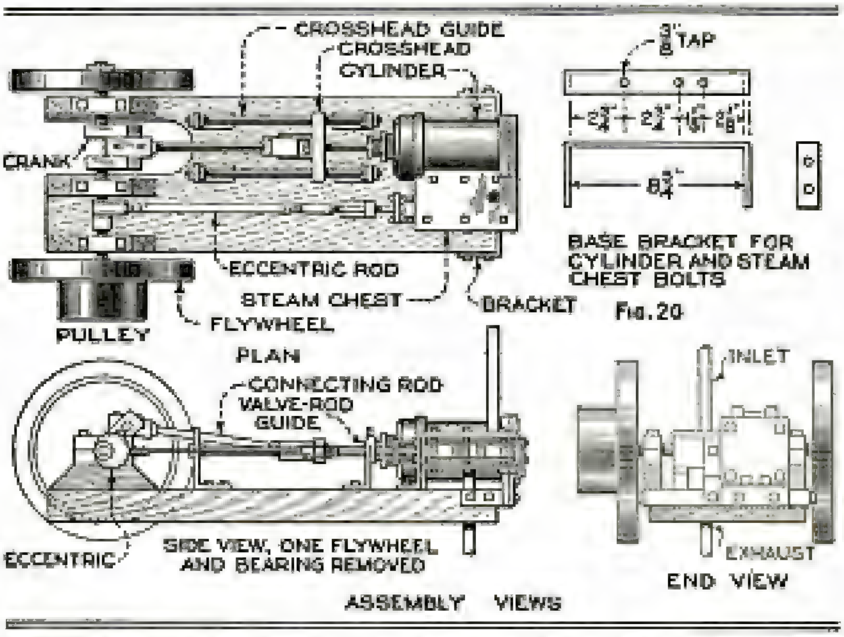
The construction of the three crankshaft bearings, Fig. 17, is obvious; they are drilled out, while clamped together, to allow babbitting, the metal being poured through the oil-cup holes, which are easily redrilled and tapped afterward.

The engine base, shown in the assembly views, is made of oak, 2 by 8¾ by 25 in. in dimensions. A heavy iron base bracket, or reinforcing bar, Fig. 20, is fastened to the rear of the base with lagscrews. The holes in the front of the bracket are tapped to take the cylinder and steam-chest support screws, or they may be drilled plain and pockets cut directly behind them, in the base, to receive nuts for the screws. After the cylinder assembly has been bolted down, the crosshead guides may be bolted in place, so that the crosshead will come to within an equal distance of each support at the ends of the stroke.

When constructing an engine in this manner, it is best to build the cylinder and steam chest first, and make the subsequent parts conform to the dimensions of these parts. This is essential, in any event, in the case of the crosshead-guide supports and valve-rod guide; these should not be drilled until the crosshead is attached to the piston rod and the valve rod to the valve, and the correct height for the holes determined. The same thing applies to the other supporting brackets. The center of the crankshaft must, of course, be the same as that of the piston rod. The base is cut out to clear the crank and connecting-rod end, and the bearing-bolt heads countersunk in the underside of the base. The base may be attached to a concrete or brickwork bed, if desired, by means of bolts set in place in the bed.

For lubrication of the piston, a standard cylinder lubricator, costing about $5, should be purchased, as it is not advisable to attempt to make this fitting.

The cost of this engine was $15.40 complete, most of the material being new; part of the material was wasted in experimenting, and the cost of the engine could be cut in half, were the work to be done over again.



Plan, and Side and End Elevations of Horizontal Steam Engine Assembled: Figure 20 Shows the Bracket Used to Fasten the Rear-End Cylinder and Steam-Chest Supports to the Base

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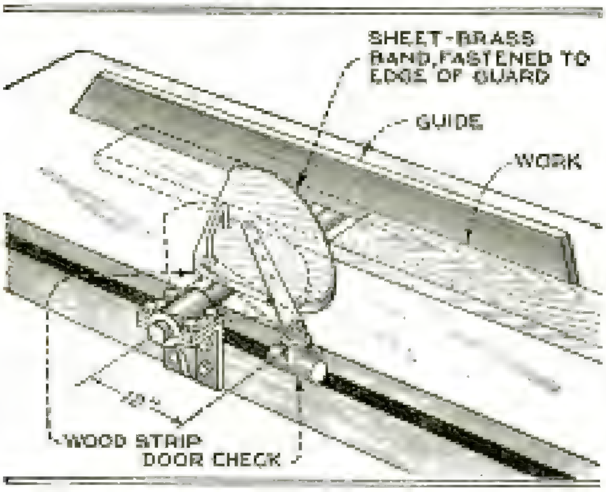
Guard for the Planer

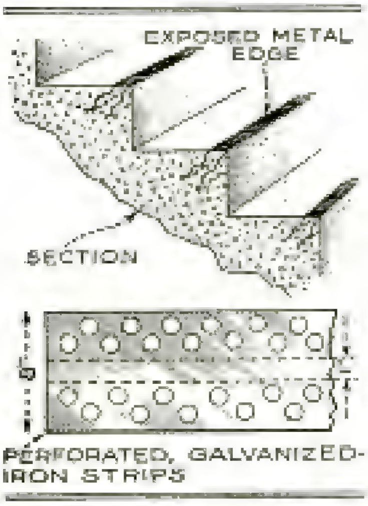
The illustration shows a very good knife guard for the wood planer. It is made of ¾-in. pine, cut to the shape shown, and is attached to a flat-iron lever fastened to the spindle of a common door check, which, in turn, is screwed to the edge of the planer table. The door check holds the guard tightly against the work guide, or against the edge of the work. The revolving knives are covered at all times. The edge of the guard is faced with a band of sheet brass to prevent wear. A drawer pull may be attached to the upper side of the guard to facilitate handling it on wide work.



An Automatic Safety Guard for the Planer, Mounted on a Door Check: The Knives are Covered at All Times

Protecting Edges of Concrete Steps

To prevent the edges of concrete steps from being broken by the impact of heavy barrels, boxes, etc., it has been found very practical to reinforce them in the manner illustrated. Strips of galvanized iron, or other metal, as long as the steps, or at least as long as the part subjected to most wear, are bent and imbedded in the concrete, as indicated. The part of the strip imbedded is first perforated with 1-in. holes along both sides, leaving a space, about 1 in. wide, that is exposed on the edge of the tread.

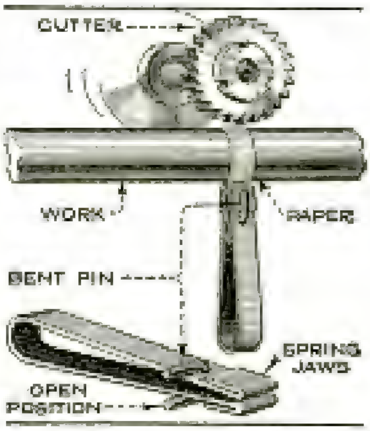


The concrete steps to the basement of a warehouse that were reinforced in this way have withstood the jars of heavy boxes for two years, and the edges do not yet show any evidence of the hard usage to which they have been subjected.

Setting Milling Cutters to Depth

The drawing shows a neat little device to aid the milling-machine operator in feeding cutters to accurate depths. It is hard to tell just when the cutter actually touches the face of the work, although, if this can be determined accurately, the rest is merely a matter of feeding the cutter to the depth indicated by the graduations on the handle.

The tool is made of thin spring steel, bent as shown, and with the ends doubled over. A short piece of ³⁄₁₆-in. wire is passed through holes drilled in the body, and bent over at both sides.



To use the tool, a piece of heavy paper, about ½ in. wide, is wrapped tightly once around the work, and the ends are caught in the jaws of the tool, which are closed on the paper by swinging the bent pin to the position shown. The table of the machine is then brought up, and at the same time run back and forth, until the revolving cutter cuts through the paper. The tool, of course, drops as soon as this occurs, warning the operator that the cutter is in contact with the work.

Scriber Set in Fountain Pen

The mechanic frequently finds it necessary to carry a scriber around, so that it is available whenever needed, but to carry it in one's pocket is rather dangerous. To overcome this difficulty, a scriber point can be set securely in the barrel of a fountain pen in the same position that the pen point and feeder otherwise occupy. The cap is screwed on the barrel as usual.

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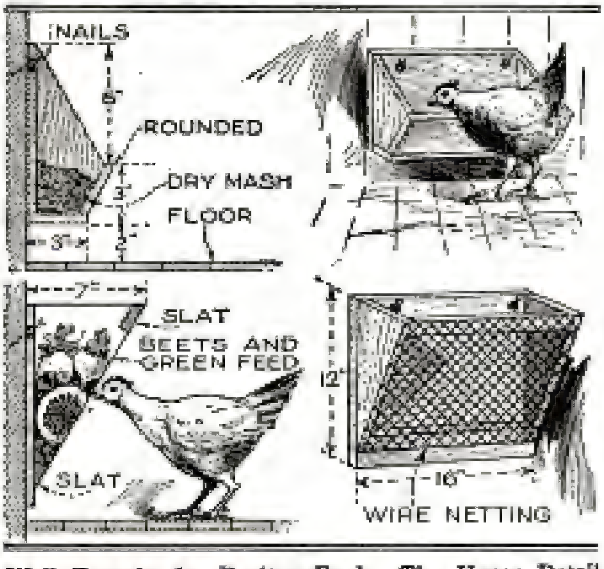
Flux for Brazing

The usual method of applying borax to metal before brazing is to apply it to the metal dry, after the metal has been thoroughly scraped or cleaned. It has been found, in a large coppersmith's shop, that a better way is to coat the metal with a solution of boracic acid. The advantage of this is that the solution penetrates every crevice, and covers the surface completely, thereby protecting it from oxidation and also from impurities while brazing. The boracic-acid solution is made by adding quantities of the acid to hot water, allowing it to remain for several hours, with an occasional shaking, and then bottling the liquid for future use.

Wall Troughs for Poultry Feed

Cleanliness and economy are effected in the chicken pen by the use of wall troughs for feed, such as shown in the illustration. They keep the feed clean, and prevent the hens from getting into the feed and scratching it out.

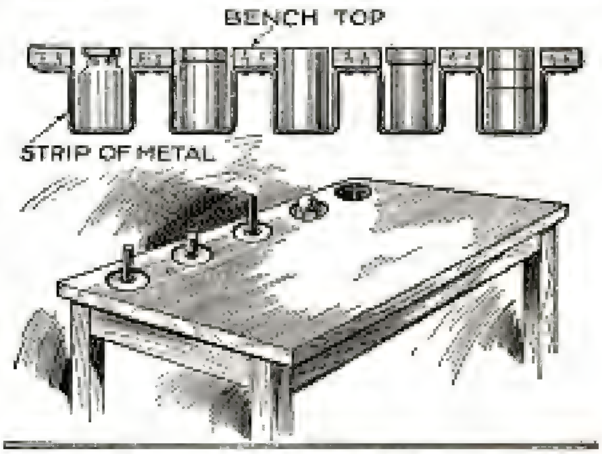
The upper detail shows a grain, dry-mash, or grit trough. It is made of wood, to the dimensions given, and is hung on the wall so that the bottom is about 2 in. above the ground. The lower detail shows a vegetable trough, made in a somewhat similar manner, with the exception that the front of the trough is made of coarse wire netting. Beets, potatoes, and green feed are deposited in the trough, and the hens pick them away, through the mesh, until the very last scrap disappears.



Wall Troughs for Poultry Feed: The Upper Detail Shows a Grain Trough and the Lower Detail a Vegetable Trough

Holding Containers on Bench

The drawing illustrates an excellent method of holding small bottles and containers in place on the workbench,



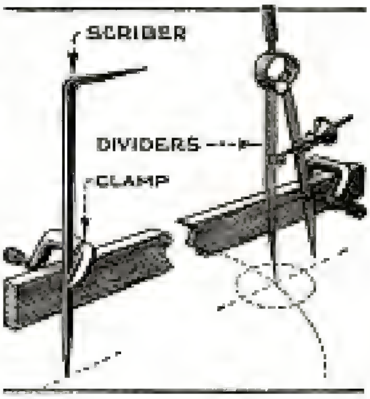
Neat and Convenient Method of Holding Containers on a Bench to Prevent Them from being Overturned Accidentally, or Damaged

to prevent them from being upset, pushed off, or broken accidentally.

A number of holes are bored through the bench top, near the rear edge, so that the bottles will be well out of the way. A strip of metal, bent as indicated, and fastened to the underside of the bench top, holds the containers in place. The holes are bored of various sizes, corresponding to the diameters of the bottles, and the metal strip is bent so that the top of each container is flush with the surface of the bench top.

An Improvised Trammel

Frequently the machinist or carpenter needs to describe a circle or arc beyond the range of the ordinary dividers. This is easily done by clamping the dividers and a scriber to a stout wooden strip, in the manner illustrated. The pointed ends of both scriber and dividers are spaced a distance apart approximately equal to the radius of the arc to be described, and exact adjustment can then be made by means of the screw on the dividers. This trammel serves just as well as the regular instrument.



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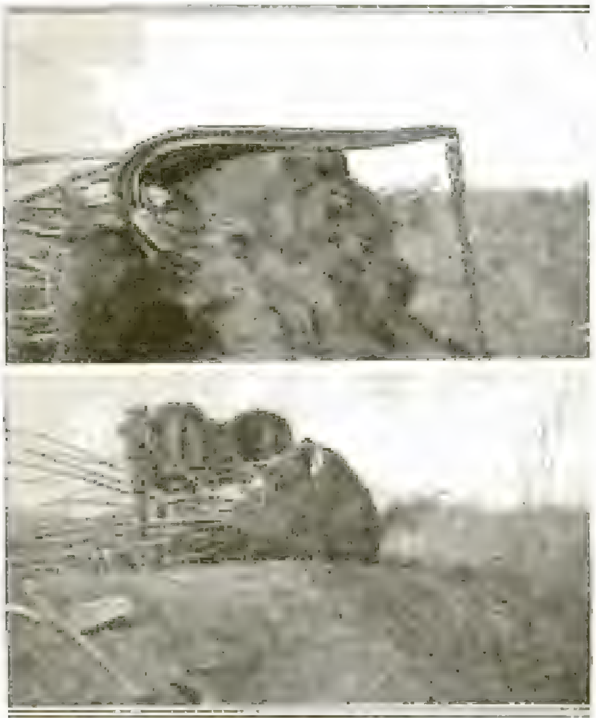
Removing Willows from Open Drain

It is usually a difficult matter to remove willows from the banks of a small stream of water, except in the dry season, and, at that time, other farm duties, such as cultivating and harvesting, are pressing and require all of the time. Hence the work of removing the willows is often neglected until the channel is almost choked.



An Effective Method of Removing Willows from an Open Drain with the Beam of a Breaking Plow Hooked behind the Roots

By employing the method shown in the photographs, I was able to remove the willows easily and completely during the wet season. I obtained the beam of an old breaking plow, and after heating it, gave it a quarter twist a few inches from the back end, so that the share was turned at right angles to the beam. This blade I sharpened, and then replaced the clumsy plow clevis on the end with a smaller one.

With a few feet of log chain attached to the beam, and a team of good horses to pull the plow, the sharpened end was hooked behind the roots, and the team started. The result was that the blade drew still deeper under the roots and removed not only the roots and bushes, but, at the same time, a considerable portion of the earth that had accumulated in the ditch.

I have found this method quite the speediest I ever tried.—Elmer Hufferd, Rushville, Ind.

Tamping Explosives

Metal tools of any kind should never, under any circumstances, be used for tamping explosives in bore holes, or to press the charge into place, even in soft ground, as there is always the danger of striking a pebble, which might produce a spark sufficient to ignite the charge.

For loading and tamping, only a wooden tamping stick should be used. For shallow work, an old broom handle is ideal; for deep holes, when a long stick is needed, a straight sapling can be used to advantage.

For tamping horizontal holes, where a heavy tamping stick, such as one made of oak or hickory, would be difficult to manipulate, a stick made of a light wood, such as pine or bamboo, is very desirable. Bamboo fishing poles, which are light, straight, and strong, make ideal tamping sticks under these conditions. It is positively dangerous for a powerful man to ram a charge of high explosives into a bore hole with a heavy tamping stick, even if it is made of wood.

In deep holes, a very long, cumbersome tamping stick would be necessary, so a tamping block is used in holes that are vertical, or nearly so. This consists of a round piece of wood, from 3 to 6 ft. long, and a little smaller in diameter than the hole, so that it will slide easily in it. A small rope is attached to the center of one end, by boring a hole diagonally from the center out through the side, countersinking the hole on the side, then threading the rope through the hole from the end, knotting it, and pulling it back, so that the knot is drawn into the countersink and does not interfere with the sliding of the block in the hole.

The block should be made of hardwood, to resist wear, no metal parts should be used, and it should not be too heavy. It is operated by raising it a foot or two and allowing it to drop on the "stemming," as the tamping material is called. The block, of course, is withdrawn when fresh stemming is dropped into the hole. The tool recently described by one of our contributors, which was made from a long bolt, has been condemned by the leading explosives experts and insurance companies, for the reasons stated above, and our readers are warned against its use.

¶Are you in doubt as to the best type of radio instrument to construct or purchase? Write to our Bureau of Information.

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Sleeping Porches for Hospital

The illustration shows how an old western hospital was converted into a modern open-air sanitarium by reconstructing the windows so as to permit the beds to be pushed out onto small porches.

The window openings, which were of the ordinary size, were cut down to the level of the floor. A small porch, supported by iron brackets, was built on the outside of each window. A light metal railing was built around the porch and fastened to the wall, and the porch was screened in to keep out flies and other insects. Two doors were substituted for the part of the wall that was cut out below the window, as may be seen in the lower photograph.

With this arrangement the bed can be drawn into the room during stormy weather, and the doors and window closed. No drafts are encountered when the doors and windows of the rooms are kept closed. Shades can very readily be attached to the porch screens to keep off the rays of the sun, if desired; however, no shades are used on the building shown in the photograph, although it is located in a country where the sun shines with little interruption for long periods.—Edward H. Flaharty, Denver, Colorado.

Above: Exterior of an Old Hospital That was Converted into a Modern Open-Air Sanitarium. Below: Interior of One of the Improvised Sleeping Porches

Reseating Globe Valves

After the seat of a globe valve had been ground several times, it became necessary to renew it. Instead of employing the usual method of tapping out and using a threaded seat, I made a plain tapered seat and forced it in place. The job was accomplished quickly because no tapping was necessary. Hard metal was used for both seat and valve.—Robert D. W. Berry, Philadelphia, Pa.

Handling Cable Ends

Anyone who has used a wire cable for hoisting purposes, or elevator work, knows the difficulty of passing the end through a hole or eye only slightly larger than the cable itself; the end will twist and turn or flare out regardless of how well it has been wired, and perhaps the tie wire must be driven back to permit the cable to pass through.

To overcome this difficulty, wire the cable as usual on the end, and also 6 in. from the end. Heat the end of the cable with an acetylene torch, or dip it first in molten lead for a few minutes, to draw the temper, and then in soldering flux, and solder. When cool, file off the surplus solder, and with a pair of heavy pliers twist the cable tightly. It will be found that it will remain twisted and can be bent any way desired. By heating the cable the hemp core is burned out, making the cable smaller. When using this method, always cut the cable long enough to allow the end to be cut off after the cable clamps are in place.

Making Tight Hose Connections

To make a tight rubber-hose connection to an air or acetylene tank, or to connect two pieces of rubber hose on a short nipple, heat the tapered end of a punch and insert this into the end of the hose for a few moments, just long enough to melt the surface of the rubber slightly. Then slip the hose over the nipple as quickly as possible. It will be found that the hose will slip over the nipple very easily, providing, of course, that the nipple is not too large. After the rubber has cooled, it will be on so tight that it cannot be removed except by cutting. No wires or clamps are necessary on a connection made in this way.—W. E. Rausch, Milan, Mich.

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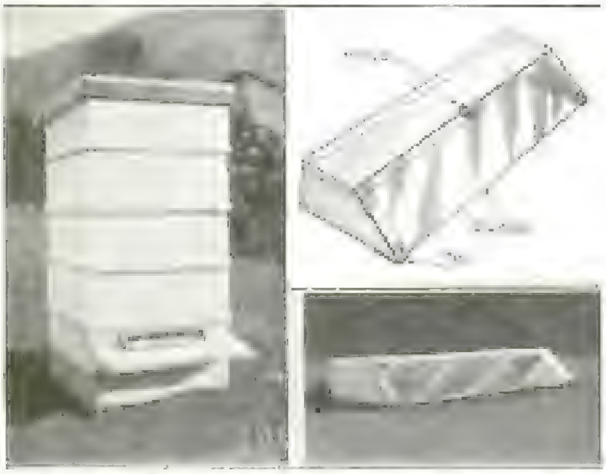
A "Sun Porch" for the Beehive

The newest "wrinkle" in beehive construction is the "sun porch." It is made of wood, with a glass front, and fits



A Detachable Glass "Sun Porch" for the Beehive That Prevents Much of the Usual Bee Mortality during Winter and Early Spring

snugly into the opening of the hive case, as indicated in the photograph. It is claimed that the attachment adds to the warmth of the hive, and prevents much of the bee mortality that is usual during winter and early spring.

The porch provides a protected and well-lighted air space, about 5 in. wide, between the inner and outer entrances, into which snow and rain cannot penetrate, and enables the bees to bring out the dead ones all through the winter, so that the floorboards are kept sweet and clean. The framework of the sun porch is made just large enough to fit in the outer entrance of the hive case, and to butt against the block of the inner entrance. The glass front, which is cut to fit the framework, projects about 2 in. over the alighting board. A small piece of tin is nailed on the bottom of each of the sloping ends of the frame, and is bent up in front to form a holder for the glass. When the glass is in position, the bottom edge is about ½ in. above the alighting board, so that the bees have a clear entrance all along. A ½ by ¾-in. slot is cut in the center of the framework, at the top of the glass, to allow any bees that may run up the glass to fly out.

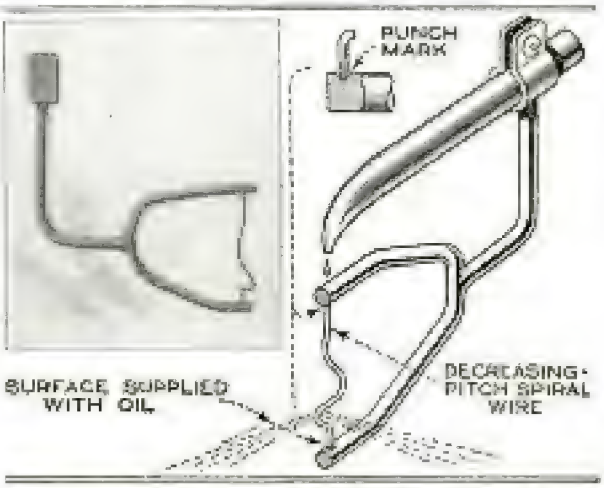
The sun porch makes it possible for the bees to be left with little or no attention throughout the winter, as there is little danger of suffocation through the blocking of entrances by snow or ice. In the early spring, the space inside the glass is heated by the sun, and the bees revel in this and become warm before flying out. The porch also acts as a protection against robbing. It is easily removed or placed in position.—R. Franklin Mundorff, Kansas City, Mo.

Window Display for Coal Dealer

A retail coal dealer has arranged a display that is considerably more attractive than the usual assortment of lumps placed on exhibition in the office window. Wooden boxes, about 3 in. wide and as deep, were made in the form of letters spelling the word "coal." These boxes were painted white for the sake of contrast, filled with small lumps of coal, and placed in the window.

Oil Distributor for Milling Machines

The illustration shows an oil distributor that will supply a large surface, and that is especially valuable on form-milling cutters, to wash chips away. It is made of a piece of fine wire, twisted into a de-



Novel Oil Distributor for Milling Machines: The Oil Running down the Spiral Causes It to Revolve, and the Final Twist Throws the Oil Off

creasing-pitch spiral, and mounted on a forked support, as shown. The weight of the oil running down the spiral causes the latter to revolve, at a speed dependent upon the amount of oil supplied. When the oil reaches the sharp twist where the pitch of the spiral is smallest, centrifugal force causes the oil to fly off. The area covered by the spray of oil depends upon the distance of the spiral above the work, the size and shape of the spiral, and the amount of oil supplied. The ends of the spiral are pointed to reduce friction and are set in punch marks made in the ends of the forked support.

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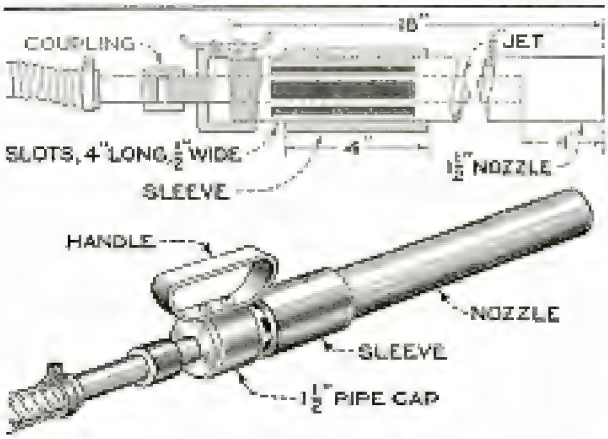
Green-Gold Plating Solution

A green-gold plating solution for jewelers' use can be made by using regular yellow-gold solution, and adding to it, while plating, ordinary silverplating solution, watching the article closely until the desired color is obtained. Use a green-gold anode, and attach to the same wire a lead anode, the same size as the gold one. After plating, the high lights are brought out by rubbing with a wet finger, dipped in bicarbonate of soda.

Homemade Gas Torch

Sometime ago I saw a homemade gas torch used for heating a collar on a large shaft. The torch was made of pipe and fittings, and was so arranged that either a yellow or a hot blue flame could be obtained by the use of a sliding-valve arrangement to regulate the air supply.

The nozzle is made from a piece of 1½-in. pipe, 18 in. long, slotted as shown, threaded at one end, and provided with a cap. A hole, drilled in the exact center of the cap, is threaded to receive the jet.

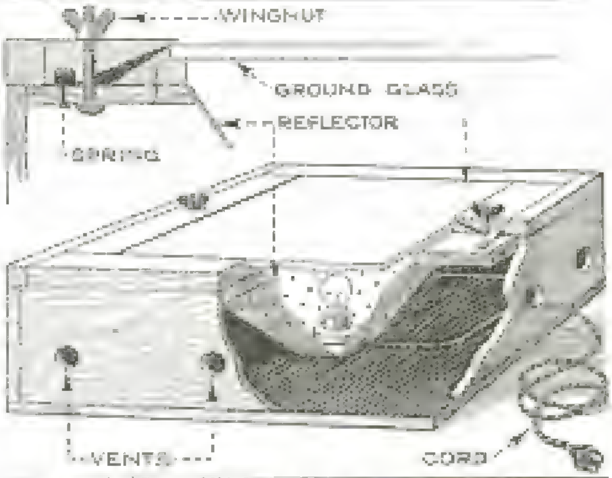


A Simple but Efficient Homemade Gas Torch with Which Either a Yellow or a Hot Blue Flame can be Obtained

This consists of a piece of ½-in. pipe, 15 in. long, having one end threaded for about 3 in., and screwed into the cap, as shown, so that the end of the jet comes about 4 in. from the end of the nozzle. A sleeve, made from a 4-in. length of pipe, is slipped over the nozzle to cover the slots; the sleeve should be a good sliding fit on the nozzle. The handle can be made from a length of strap iron, riveted or screwed to the cap as shown. The amount of gas fed to the torch is controlled by a valve in the line, and the air supply by means of the sleeve over the air slots.—L. B. Robbins, Harwich, Mass.

Improving the "Steamboat"

The drawing shows an improvement on the "steamboat" used for tracing designs and drawings. The improvement con-



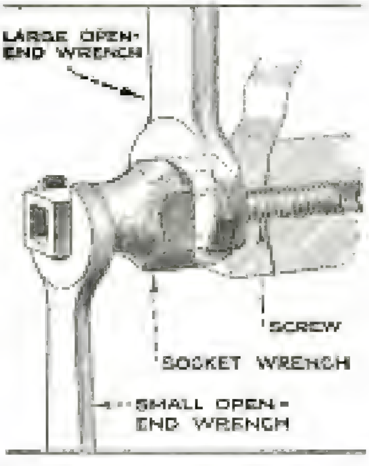
A "Steamboat" can be Greatly Improved by Providing It with Two Wooden Clamps on Opposite Sides to Hold the Work on the Glass Securely

sists in fitting two wooden clamps on opposite sides of the box to hold the work securely on the glass, and to prevent it from being moved accidentally while tracing.

The clamps are maple strips, held in place with bolts provided with wingnuts, as indicated. A flat steel spring is fitted under each clamp, to raise it when the wingnut is loosened in order to make it easy to insert the work.

Removing Tight Bolts or Screws

A convenient and effective method of removing tight bolts or screws is to place an ordinary detachable socket from a wrench set over the nut, so that two wrenches can be applied at the same time, as shown; the larger wrench on the side end of the socket keeps the socket from splitting open under the force applied to it with the smaller wrench. In almost every case this method will be found to loosen the bolt, without springing a good wrench, which is often done on jobs of this kind.



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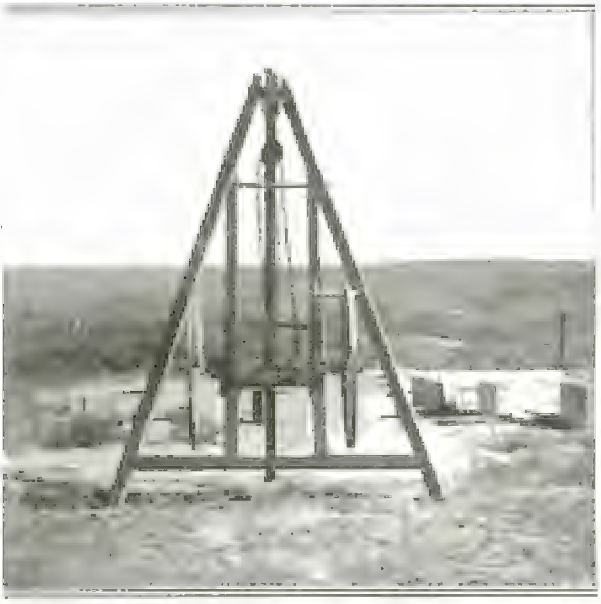
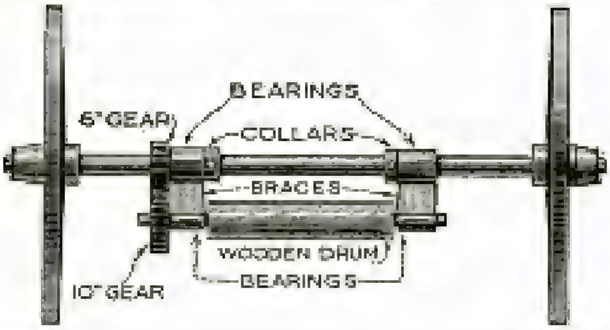
Serviceable Homemade Hoist

The portable hoist shown in the illustration has been found of great utility by a contractor whose work involves the





Above: The Homemade Hoist Set Up Ready for Use. Below: Details of the Hoist Mechanism

placing of concrete burial vaults weighing about 1,800 pounds.

The legs of the hoist are 12-ft. lengths of 4 by 4-in. stock, two of the legs being braced in the form of a triangle by a crosspiece and uprights of the same stock. The other leg swings, on a 1-in. bolt, between the first two, at the apex of the triangle. This leg is swung out when the hoist is to be used, and folded in against the other two when the hoist is to be hauled away.

A 6-in. wooden drum is fastened to an axle that runs in bearings bolted to the vertical 4 by 4-in. pieces, and a 10-in. gear is keyed on one end of the axle. This gear meshes with a 6-in. gear, keyed on a shaft that runs in bearings mounted on the other side of the uprights, and two buggy wheels are fastened to the outer ends of the shaft. By loosening the collars shown in the detail, the shaft can be slid endwise, to put the gears out of mesh, when moving the hoist.

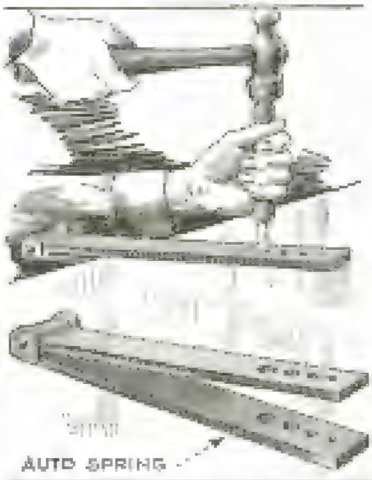
A heavy piece of wood, 2½ ft. long and fastened to one of the legs by a bolt, so as to permit its being pressed against the rim of the wheel, is used as a brake when lowering the load, and a long iron bar, sliding in a flat-iron bracket bolted to one of the legs, can be used to hold the load at any desired height, by thrusting it between the wheel spokes.

A heavy block and tackle is slung from the center leg by a clevis, the end of the cable being attached to the drum. Two long bolts, fastened through the triangular-frame legs, about 3 ft. from the bottom, provide handholds for moving the frame about, and spikes are driven into the lower ends of each leg to prevent slipping.

A large hook, fastened to the upper end of the center leg, allows the hoist to be attached to the rear end of a truck or car.—J. C. Coyle, Colorado Springs, Colo.

Guide and Die for Punching

When punching holes in sheet metal, it is sometimes difficult to locate the die exactly under the punch, especially when the holes to be punched are at some distance from the edge. To facilitate punching such holes, I made the tool shown in the illustration. It consists of the two opposite outer leaves of an elliptic rear spring. These I heated, straightened out, and cut to a convenient length, and then fitted the sockets so that, when hinged together, there was no sideplay. I drilled holes of various sizes through both pieces, after hinging, and then retempered the pieces. The tool thus made is placed over the sheet, so that a hole of the proper size is over the place where the hole is to be punched. It is then an easy matter to punch the sheet; the bottom piece serves the purpose of a die and is always in the exact position to receive the punch as it is driven through.
—G. G. McVicker, North Bend, Neb.



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An Improved Lawn Canopy

By C. W. Morgan

THE lawn canopy shown in the illustration is rather unusual in design, and is very easy to construct. It may be used to shade the outdoor dining table or lawn furniture, and a hammock may be swung between its supports. The construction eliminates the faults of the common types, such as the sagging of the canvas and slacking of the ropes that are caused by changes in the weather.

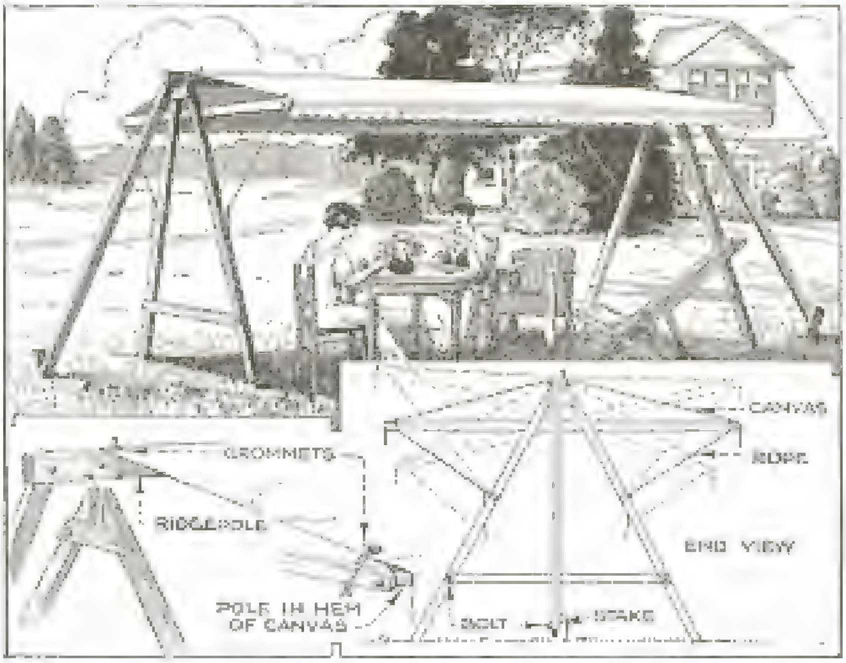
The end supports are made of 2 by 4-in. stuff, the two sides of the triangular frame being 8 ft. 6 in. long, and braced, near the bottom, by a piece of 1 by 3-in. stock, 7 ft. 6 in. long. Bolts are used to fasten the frame together, and a space for the ridgepole is left between the upper ends of the sidepieces.

The ridgepole is a 12-ft. length of 2 by 4-in. stock, notched at each end, to fit over the upper edges of the top crosspieces on the end frames, drilled, at the ends, for the bolts that fasten the end braces to it, and bolted to the sidepieces of the frame.

The end brace is 8 ft. 6 in. long, also of 2 by 4-in. lumber; it is bolted to the ridgepole at the top, and to a stake, driven into the ground, at the bottom. This, in the writer's opinion, is the best way to fasten the braces, although, of course, they can be fastened to the frames by struts, thus eliminating the stakes.

The canvas, which is 11 ft. long by about 11 ft. wide, is kept taut by a frame made of 1 by 3-in. stock and 2-in. poles or pipes. The frame is 11 ft. by 9 ft. 6 in. in dimensions, and the poles are fitted in hems, 4 in. wide, sewed in the canvas as shown in the detail. If pipes are used, the ends must be plugged for the screws or pins that fasten the 1 by 3-in. crosspieces to them.

Brass grommets are fastened in the canvas, at the points indicated, and tie ropes pass through them. The center grommets may be slipped over pegs in the ridgepole, or ropes passed through them and round the pole. The end tie ropes are fastened around the sidepieces of the canvas frame, and then led down to the legs of the main frame and tied within easy reach of the hand.



An Improved Type of Lawn Canopy, of Substantial Construction: The Canvas is Always Kept Taut, and, as the Top can be Tilted to Either Side, It Provides Plenty of Shade at Any Part of the Day

With this design, the canopy is always taut, and may be tilted to either side, as indicated by the dotted lines, thus making it serviceable for use any part of the day. If bolts are used to fasten the frame together, the whole canopy can be dismantled and folded up into a comparatively small space. The ridgepole and braces fold up together, and the end frames may be collapsed also, by removing only two bolts.

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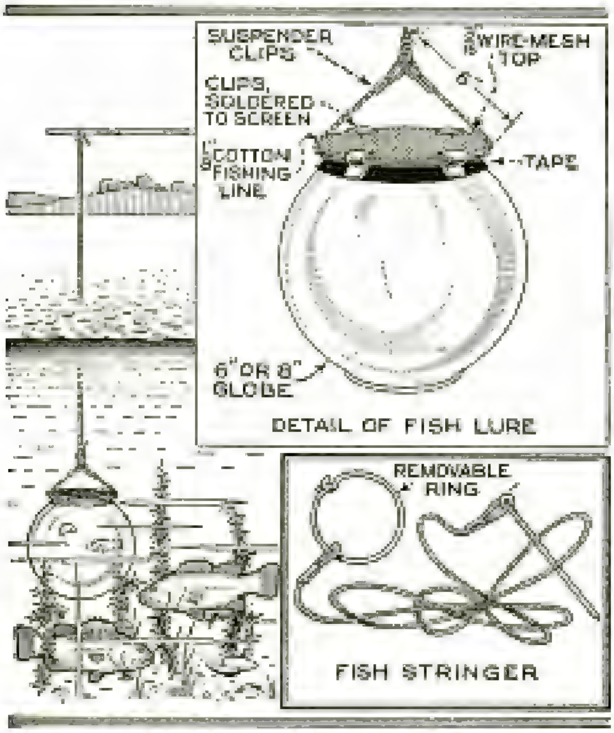
Two Kinks for the Fisherman

The drawing shows a fish lure that seldom fails in its purpose, providing, of course, that there are fish in the vicinity.



Above: A Transparent Glass Bowl, Containing Minnows, That Forms an Excellent Fish Lure. Below: The Fish Stringer Provided with Detachable Ring

The lure consists of a transparent glass bowl, preferably a goldfish bowl, about 6 or 8 in. in diameter, containing some minnows. It is suspended in the water a foot or two away from the point where the user is fishing.

To make the lure, cut a circular piece of galvanized, or copper, screen wire, about $\frac{3}{16}$-in. mesh, to fit over the opening of the bowl. Solder four brass clips, shaped to fit under the edges of the bowl, to the screen, as shown. These keep the screen firmly in place while the bowl is immersed. Wind two layers of friction tape around the neck of the bowl, coat well with a good varnish, and allow it to dry. Then take a line of $\frac{1}{8}$-in. cotton, of sufficient length to go around the neck, and allow two suspension leads about 6 in. long; form loops on the ends of the leads, and fasten the loops with common suspender clips. Then fasten the cord around the neck, apply another coat of varnish over the cord, allow it to dry, and the lure is ready for use. Fill the bowl with water, and place in it some live minnows, put on the cover, and lower into the water. I have found from experience that it is best to use from six to twelve minnows.

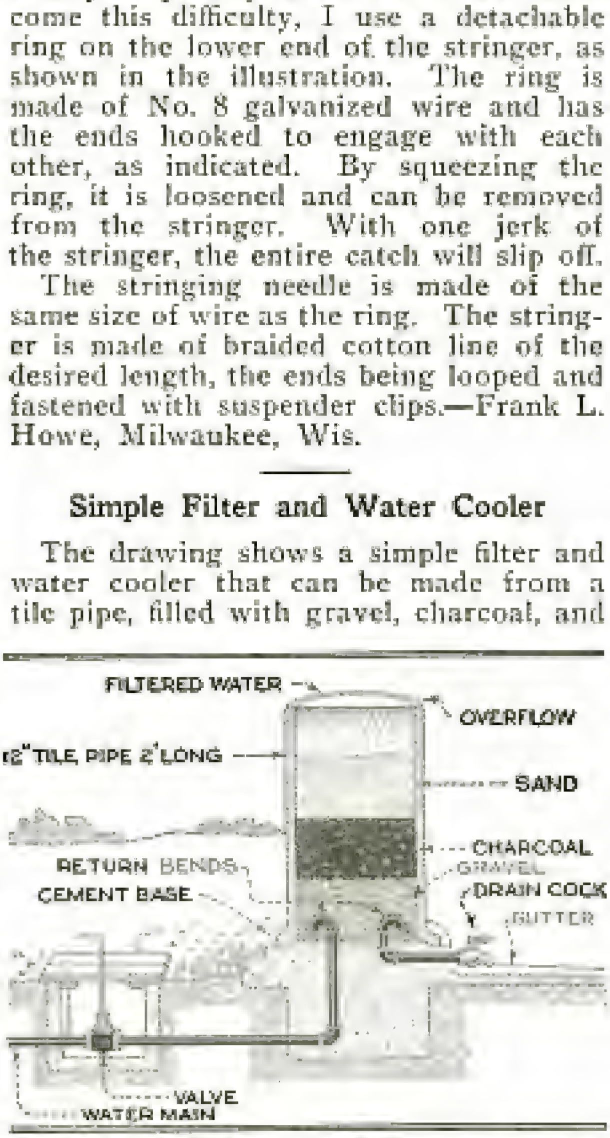
I have employed this lure for catching herring and perch, with a minnow on my hook about 3 ft. away from the lure. When the water is clear, the fish can plainly be seen to dart at the minnows in the bowl, but, upon coming in contact with the glass, they seem to realize that something is wrong, and immediately turn and snap at the minnow on the hook.

When removing fish from a stringer, it is usually necessary to force them back over the stringing needle, and this is not a very easy or pleasant task. To overcome this difficulty, I use a detachable ring on the lower end of the stringer, as shown in the illustration. The ring is made of No. 8 galvanized wire and has the ends hooked to engage with each other, as indicated. By squeezing the ring, it is loosened and can be removed from the stringer. With one jerk of the stringer, the entire catch will slip off.

The stringing needle is made of the same size of wire as the ring. The stringer is made of braided cotton line of the desired length, the ends being looped and fastened with suspender clips.—Frank L. Howe, Milwaukee, Wis.

Simple Filter and Water Cooler

The drawing shows a simple filter and water cooler that can be made from a tile pipe, filled with gravel, charcoal, and



An Efficient Water Filter and Cooler Made from a Two-Foot Length of Tile Pipe, Filled with Gravel, Charcoal, and Sand

sand; the water enters the filter from below, flows over the top of the pipe, and is caught and led off by a gutter in the cement base.

The tile pipe is 12 in. in diameter and about 2 ft. long, and is set in a cement base, formed as shown. The water main enters from below, through the cement base, the end of the main projecting into

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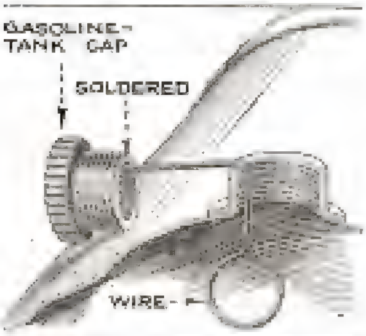
the tile pipe being fitted with a return bend, to prevent the gravel from choking the pipe. The water is regulated so as to rise slowly through the filter and overflow down the wall of the pipe, the partial evaporation of the water keeping the wall cool, and consequently the water inside. A drain cock should be provided, as indicated, so that the filter can be drained when it is to be cleaned, and new gravel, etc., substituted for the old.

Retainer for Gasoline-Tank Cap

The loss of gasoline-tank caps is a frequent occurrence, which, however, can easily be prevented by means of the simple attachment illustrated. One end of a length of wire is soldered to the cap; the other end is bent into a loop, and a right-angle bend is made in the center of the wire. The loop at the end of the wire must be a little larger than the opening in the gasoline tank, and is sprung a trifle in order to force it through the opening.

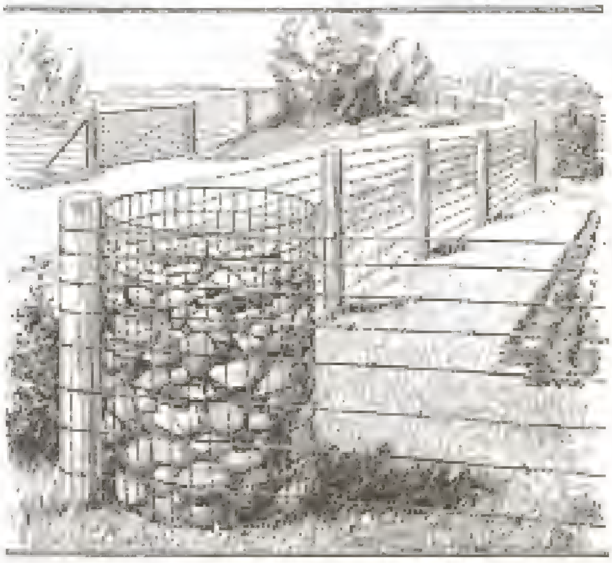


Neat Method of Piling Stones on Cleared Land

A neat way for a farmer living in a rocky region to pile the stones gathered from his fields is to dispose of them in woven-wire containers located in the corners of the fields.

The containers are made from 12-ft. lengths of woven-wire fencing, rolled into the form of cylinders, the two meeting edges of each being stapled to a corner post. In filling the containers, the heavy stones are, of course, thrown in first. As the pile grows higher, it is built as evenly as possible to prevent it from sagging to one side. It may be necessary to drive a long stake on the side of the container opposite the corner post, and staple the mesh to the stake also. It is desirable that the mesh of the fencing be smaller at the top of the cylinder, so that the smaller stones will not fall through.

The piles of stone so arranged have a neat and roughly ornamental appearance, and add materially to the strength of the fence, by bracing the corner posts. When the containers have been filled, a cement

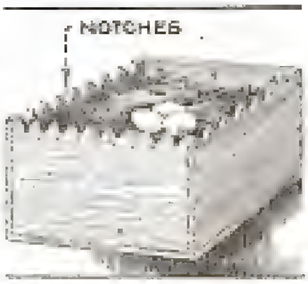


Neat Method of Piling Stones Picked Up from Cleared Land: The Stone Piles Also Add to the Strength of the Fence

composed of 1 part portland cement to 1 of sand can be poured over the pile, and tamped into all the crevices, making a solid, almost everlasting corner post, which will take the place of the wooden one when the latter is no longer serviceable. A solid foundation can be provided by digging under the pile, one side at a time, allowing some of the stones to drop into the excavation, and filling in with cement, or the hole can be dug before the stones are piled in the corner, the larger stones placed in the hole, and the cement poured in before building higher.—Ward L. Schrantz, Carthage, Missouri.

Preventing Poultry from Roosting on Nests

Finding that chickens had a preference for roosting upon the nests, rather than upon the roosts provided for them, the writer hit upon the simple idea illustrated to prevent this, and found that it worked effectively from the start. All that is necessary is to saw notches in the edges of the nest boxes, as indicated. The notches are cut about 2 in. deep, and need not be of uniform size, although this makes a neater job.—Edward L. Clark, Scranton, Pa.



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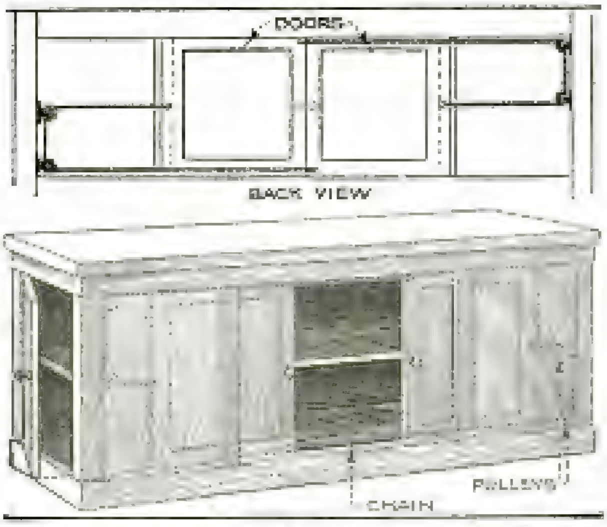
Novel Sliding Doors for the Buffet

The novelty of the sliding-door arrangement for a buffet or cabinet, shown in the drawing, lies in the fact that both



A Novel Arrangement of Buffet or Cabinet Doors: Both Doors Slide Open at the Same Time, and All the Interior Space can be Utilized

doors open at the same time, although only one of them need actually be pushed.

Four small grooved pulleys and two lengths of light chain are used; sash cord or rope may also be used, but chain is preferable, as it will not stretch. The method of arranging the pulleys and chains is clearly shown in the upper detail. An additional feature of merit is the provision of end doors and shelves, so that all the space in the cabinet can be utilized.—C. F. Wilhelm, Kitchener, Canada.

Transplanted Onions Grow to Double Size

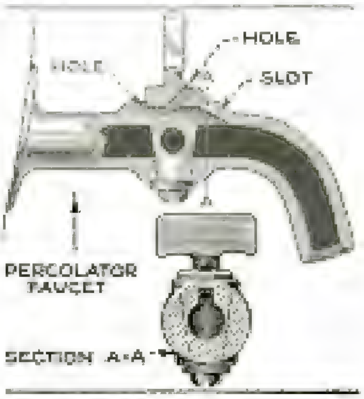
Last year I planted a large patch of onions in my garden, and as soon as they were large enough for table use, I pulled about half of them out to allow room for the others to develop into bulbs. After the tops were trimmed and the fiber roots cut back, to prepare them for market, I found more garden space available and decided to replant them.

The soil of the two onion beds was practically the same, and there was no difference in the method of cultivating, but nevertheless the replanted onions developed bulbs that were double the size of the others.

This was quite a mystery to me, until an elderly market gardener explained that I had accidentally discovered one of the secrets of successful onion culture. According to him, the removal and trimming of the onions when they were little larger than a lead pencil, caused the fiber roots to branch forth with thousands of minute roots, and limited the development to the bulb, which consequently grew to abnormal size.—G. E. Hendrickson, Argyle, Wis.

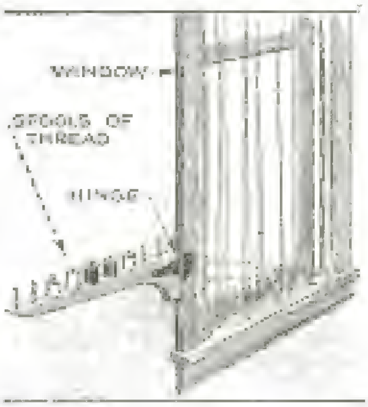
Improving Percolator Faucet

The illustration shows how a faucet for use on coffee percolators, etc., can be improved to prevent the drip that occurs a few seconds after the faucet is shut off. Two 3/32-in. holes are drilled in the plug, and a 1/8-in. slot is filed in the body of the faucet, as indicated. The holes, in connection with the slot, provide an air vent that opens the instant the faucet is shut off, and prevents the retention of any liquid in the nose of the faucet.—G. B. Olson, Bridgeport, Connecticut.



Spool Holder for the Sewing Room

A piece of 3/4-in. wood, cut to the shape shown, hinged to the window casing so that it can be swung out, and provided on the upper edge with a number of pins or dowels, makes an excellent spool holder for the sewing room. The holder can be made as long as desired, and smoothed down, stained, and varnished to match the window casing. Holes, slightly smaller than the pins to be used, are drilled in the top of the holder, to an even depth, and about 1 1/4 in. apart. Large nails, about 4 1/2 in. long, clipped to even lengths, and with the upper ends rounded, make good pins.—E. W. Hall, Catskill, N. Y.



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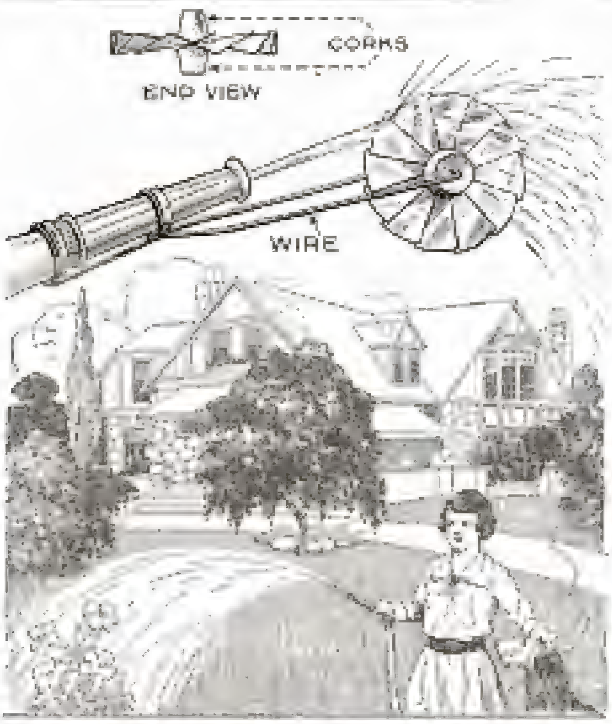
Bag Used as Dust Container

A cobbler who had installed an electric finishing machine found himself confronted with the problem of disposing of the dust. It was impossible to discharge the dust outside of the building, on account of the adjoining buildings. The difficulty was overcome by simply taking a grain bag and fastening it over the exhaust pipe, in the same way as the dust container is fastened to a vacuum cleaner. All the dust was retained in the bag, which was easily emptied.

Spraying Attachment for Garden Hose

The chief objection to the use of an ordinary garden-hose nozzle for spraying shrubbery or plants is that the flow of water must be reduced to a fine spray before any considerable area can be covered. To eliminate this objection, an attachment was made for the hose nozzle as shown in the drawing. A disk was cut from a tin can, and radial slits cut in it as indicated; after bending the sections, to form a "fan," the disk was mounted on a piece of heavy wire, bent and attached to the hose nozzle. Two

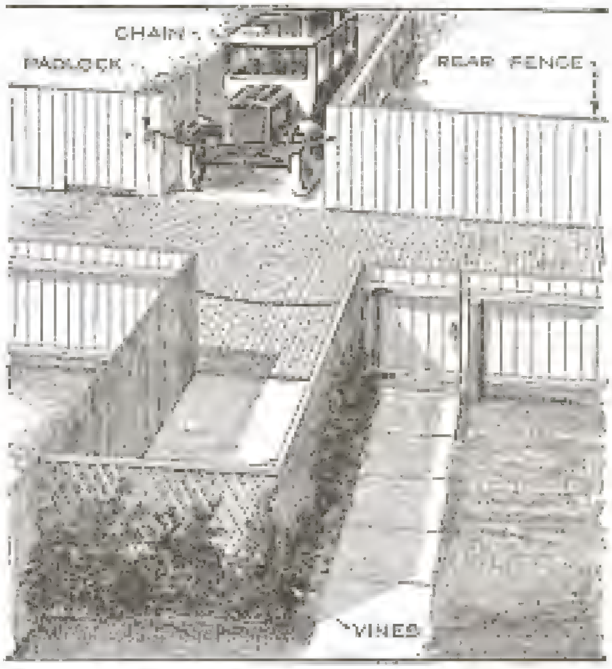


An Attachment for the Garden-Hose Nozzle That Enables the Spray to Cover a Wide Area and Prevents Injury to Plants and Flowers

corks were drilled and fitted on the wire, one on each side of the disk, to hold it in a vertical position. With this attachment, it is possible to use the full stream of water without damaging the plants.

Recess in Fence for Car

The illustration shows an arrangement used by a resident of Washington, D. C.,



A Recess, Built in the Backyard Fence, and Equipped with a Chain and Lock, has been Found Convenient for Storing a Car Temporarily

for the temporary storage of an automobile until a garage could be built. A 7-ft. section of the backyard fence is removed and a recess, 14 ft. long, built in; it may be built of the same material as the fence, which is, perhaps, most advisable because the section of the fence cut out can then be used; or it may be built of latticework, as shown in the foreground, and vines planted around it, which would be the more decorative method. A strong chain is fastened securely around a corner post on one side of the entrance, and equipped with a heavy padlock, that can be snapped on an eyebolt fastened to the opposite corner post. If the recess is used during winter, it should be provided with a light roof to keep off the snow.—G. A. Luers, Washington, D. C.

Improvised Sash Weights

While repairing an old country building, sash weights improvised from old bottles filled with sand, were found to be entirely satisfactory. Although these weights were used only on one sash, they can be used equally well on both, but a lath, or other strip of wood, should be fastened vertically between the two adjacent bottles to prevent them from hitting each other and breaking.—P. F. Noyes, Wulfert, Fla.

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Trousers Made to Fit in High Boots

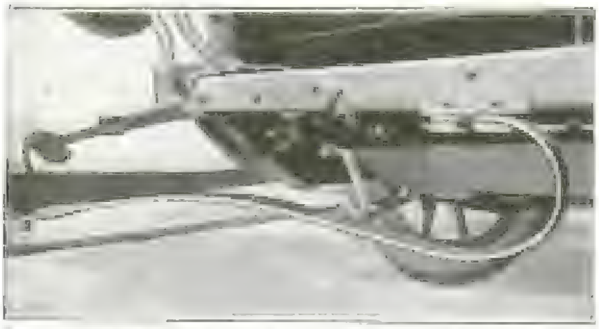
A camper who found it rather uncomfortable to have the bulgy bottoms of his trousers "stuffed" into his high boots,

Alterations That Enable the Camper to Wrap the Trousers Snugly around the Leg, Eliminating the Discomforts Experienced While Wearing High Boots

soon remedied the trouble by cutting off the bottom hem of the trousers, a practice called "stagging" by woodsmen, then ripping open the inner seam of each leg nearly up to the knee, and resewing the seams down to the calf, fitting the cloth loosely to the leg. Small snaps were used to hold the part of the trousers below the calf snugly around the leg. For additional security, a small tape was sewed on at the bottom, so that it could be tied around the leg just above the ankle. The alteration thus effected eliminated all the difficulty previously experienced when pulling the high boots and socks on or off, and was much more comfortable than the previous method.—Leroy W. Hutchins, Bronxville, N. Y.

Shock-Absorbing Radius Rods

The radius rods on a light car often cause considerable trouble, owing to the rapid wearing of the ball-and-socket joint

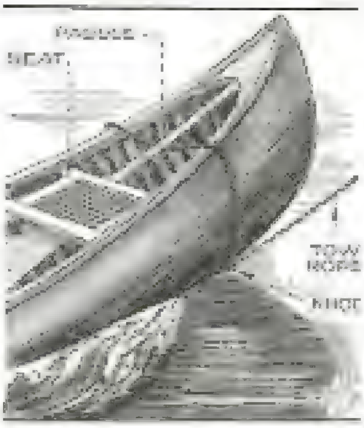


Flat-Spring Radius Rods Substituted for the Usual Rods on a Light Car; They are Bolted to the Frame Instead of the Crankcase

under the crankcase. To prevent this trouble, a California man substituted for the regular rods, spring radius rods of the design shown in the photograph. They are made of flat spring steel, 3/8 in. thick and 1½ in. wide. One end of each is bent to a semicircle of about 3½-in. radius, and bolted to the frame, as indicated, and the other end to the underside of the front axle at the point where the ordinary radius rod is fastened. The curve in the spring allows vertical motion of the axle and also a slight "cushion" to the thrust of the rear wheels, thus materially lessening the shocks on the body and engine.—E. B. Winter, Alhambra, Calif.

Towing a Canoe

When towing a canoe behind a motorboat, great difficulty is usually experienced in keeping the light craft from yawing from side to side and upsetting, unless some expert is in the canoe to keep it in the track of the leader. However, this is a "ticklish" position for one to be in, as it means constant vigilance and considerable muscular effort to avoid a bath.



The difficulty can easily be eliminated by attaching the tow rope to the bow of the canoe in the manner shown in the illustration; the canoe can then be towed unoccupied, and will be found right side up and dry at the end of the trip. Tie the tow rope in a bowline, or any other secure knot, around the bow of the canoe as tightly as possible, pulling the knot under the middle of the canoe so that the rope will tend to pull the bow upward. Force one of the paddles under the forward seat or thwart, then over the loop of rope, and force it under the little triangular piece set in the bow of the canoe. This keeps the towline from slipping off the front of the canoe, and any speed can be made, with the assurance that the canoe will follow without any trouble.—R. Melrose, St. John, N. B.

¶To remove dust and lint from dark-colored clothing, rub lightly with a piece of damp chamois skin.

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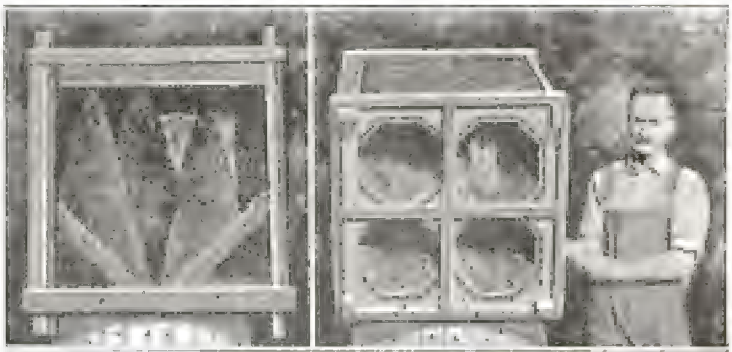
Fly Trap for Dairy Barns

Milking fly-tormented cows in "fly time" has always been one of the farmer's special trials. One farmer, however, by an ingenious application of the wire-cone fly trap to his special needs, has been able to keep his cow stable almost free of flies. Not only has this made milking easy, but the milk flow has been noticeably greater.

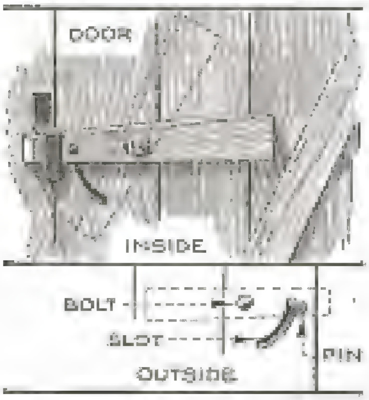
A barrel of separated milk, which is used for feed, stands just outside the barn door on this farm. This barrel is, of course, a great attraction for the flies, and they swarm around it in large numbers. This milk is used as a bait, the fly trap illustrated being placed over the container. The trap consists of a wooden framework, about 2 ft. square, which is covered with wire-screen cloth on all but the bottom side. In the open side four screen-wire cones are fastened to suitable strips; the small open ends of the cones extend inside the trap to within a few inches of the top, and the spaces between the large ends and the trap sides are filled in with pieces of wood, to prevent the flies from escaping. In use, the trap is placed over the top of the milk barrel, so that a part of the bottom opening of each cone extends beyond the edge of the barrel. Flies, in trying to get into the barrel, enter these cones, go up through them, and out at the top inside the trap, from which there is no escape. The top cover of the trap is hinged so that the dead insects can be removed as required. Boiling water can be used to kill the flies before the trap is opened. With such a trap unbelievably large numbers of flies are caught; as much as 5 lb. of dead flies have been removed at one time from it.—Florence L. Clark, McGregor, Ia.



Side and Bottom Views of Effective Fly Trap, Showing How Cones are Placed and How the Bottom is Arranged

Self-Acting Door Latch

A door latch for barns and granaries should be certain in action, so that the door cannot open accidentally after being shut. A spring door latch frequently gets out of order, and is therefore not very satisfactory, but a simple wooden self-acting latch of the kind shown in the illustration has been found entirely suitable for the purpose.



The latch consists of a single piece of wood, tapering from 4 in. to about 2 in. in width, so that one end will be much heavier than the other. It is bolted to the door loosely and slightly off center, so that the heavy end always tends to swing down. A curved slot is cut in the door, and a wooden pin, fastened in the latch, passes through the slot so that the door can be opened from the outside. When the door is closed and the latch is released, it swings to the closed position, owing to the greater weight of the wide end.—H. F. Grinstead, Columbus, Mo.

Edging Lawns with a Blowtorch

Where the surface of a walk is on the same level as the lawn, it is a common practice to trim the overhanging grass by means of a spade or other sharp implement, leaving a small V-shaped trench. This may be practicable on some lawns, but if there is much of a slope to the walk, the rains often wash away the soil thus exposed, and make refilling necessary at intervals.

Under such conditions it is better to refrain from further trimming, and allow the grass to grow. As soon as the roots have gained a firm foothold, to prevent erosion of the soil, further growth can be checked for the remainder of the growing season by running the flame of a gasoline blowtorch along a narrow strip. It takes only a few minutes to scorch several rods of grass along the margin of the walk.

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CONDUCTING AN EMPLOYMENT AND INFORMATION BUREAU

By E. W. Hitchcock

Awarded Second Prize—$50.00—in Contest on Occupations for Shut-Ins

A WOMAN in a small country town in the East, who is confined to her bed by paralysis, conducts a very successful employment and information bureau. The methods applied by this woman should bring to others, similarly situated, not only the same measure of success, but also freedom from the mental depression that not infrequently accompanies bodily infirmity.

Beginning with two or three girls, for whom she undertook to find employment, her business has grown until her clientele covers the whole town and a large part of the surrounding country. She compiled a list of prospective employers in many different lines of business, and a corresponding list of prospective employes, and solicited patronage by means of personally written cards, and outlines of the qualifications of the applicants on her waiting list. She maintains a list of boarding houses and homes, to which she can send her clients, with the assurance that they will be suitably placed, and conveniently located, and where they can obtain rooms or board at reasonable rates.

Her ready sympathy, capability, and thorough understanding of the needs of employers and capability of employes, made both her firm friends, and, through these qualities, her business has increased until the financial return is sufficient to keep her in comfort.

The information bureau grew out of the employment business. By means of a large collection of books, magazines, trade journals, catalogs, and government bulletins, she has a wide variety of information at hand, and, with the assistance of the nurse who attends her, provides a service that is immensely appreciated by those in the community.

The conditions in most small towns are very similar, and, while some revision and adaptation of her methods and ideas may be found necessary to suit the particular needs of other communities, the general principles will apply anywhere, and the equipment used in this case will serve equally well in other cases.

The hanging table shown at the top of the illustration was the first piece of equipment made. The table itself is made of light lumber, and is 18 by 30 in. in dimensions. Two large screweyes are driven into one of the 18-in. edges, and these slide on a wooden arm, shaped as shown, and hinged to the head of the bed at a convenient height. A piece of spring wire, bent and fitted to the end of the arm, as shown in the detail, keeps the table from sliding off the arm accidentally, while permitting it to be removed whenever necessary. At the bottom of the table, a 6 by 6-in. block is hinged; this supports the table level on the bed, when in use, and is folded back flat against the table when the latter is dropped. A portable typewriter, while not part of the original equipment, could be fastened to the table as shown in the lower right-hand view, and would prove of great value as the business grew, as not only would it save a lot of time, but would give a much more businesslike appearance to the outgoing letters and cards. For shut-ins who have lost the use of one arm, a stout cord could be attached to the lower end of the table and to the bed within easy reach of the patient's mouth. By gripping the cord in the teeth, the table could be raised to the bed, with a little assistance from the remaining hand; this applies also to the telephone.

Another piece of equipment that is indispensable, is the hanging filing cabinet. This is a light, but strong box, 18 in. wide, 24 in. long, and 6 in. deep. It is divided into as many compartments as necessary, one large enough to contain letterheads and envelopes; another for fountain pen, blotter, erasers, pencils, writing and scratch pads, etc.; the remainder of the space may be divided to suit the cards on which are listed the names and ad-

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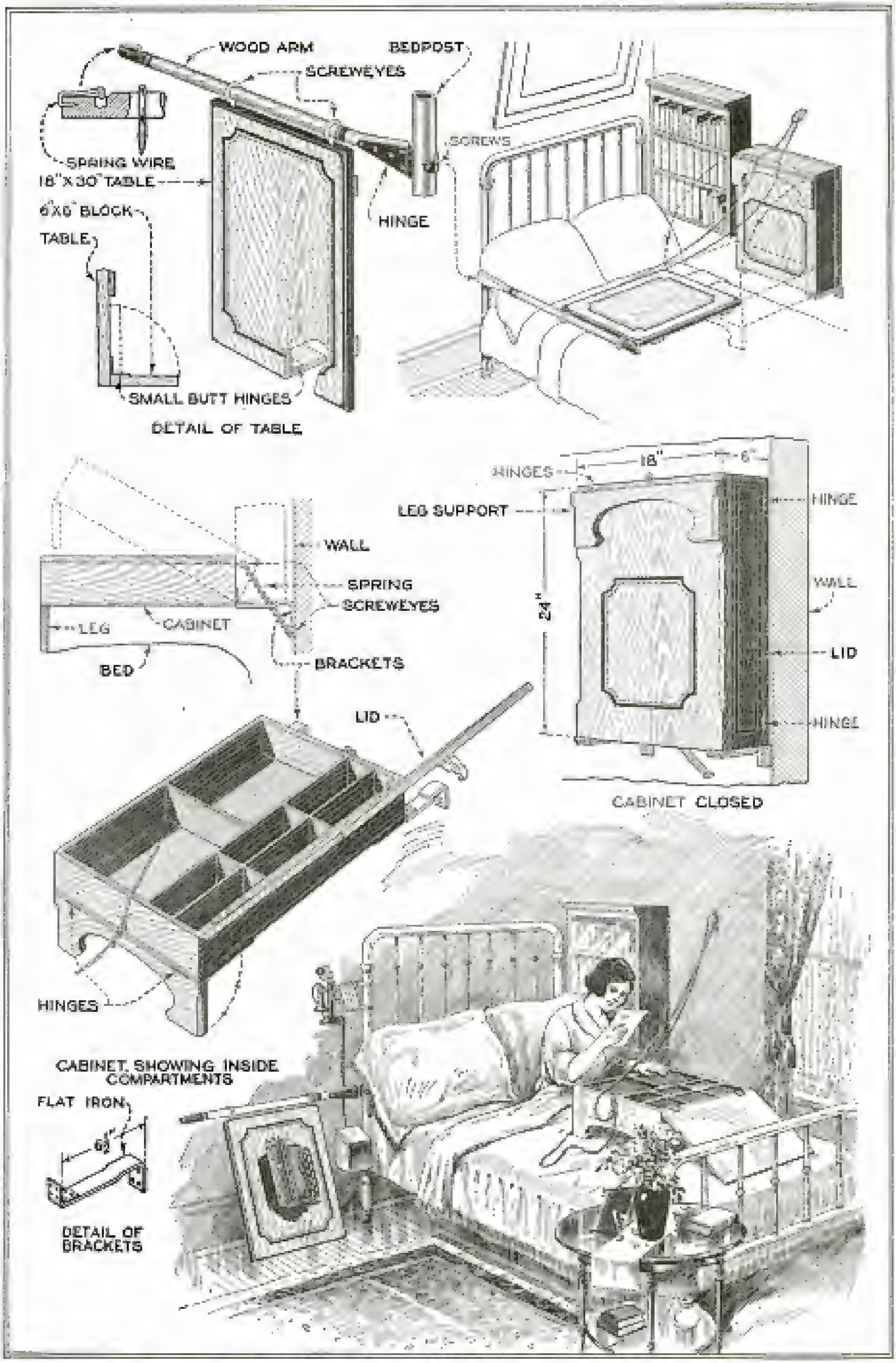

Simple and Easily Constructed Equipment for the Information and Employment Bureau Managed by the Shut-In: The Hanging Table, Hinged to the Head of the Bed, Provides a Splendid Writing or Typewriter Desk. The Hanging Cabinet Contains All Supplies for Correspondence, Together with the Index Cards Necessary for a Successful Business

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dresses of employers and employes, and references to data for the information bureau.

The cabinet is hinged to the wall by means of two brackets, made of 3/8 by about 1 1/4-in. flat iron, 6 1/2 in. long; these are shaped as shown, and have strong butt hinges riveted or screwed to the outer ends, the hinges being also screwed to one of the 18-in. sides of the cabinet. A short, strong spring, which may be a screen-door spring, cut down, is attached to the cabinet and wall, as shown in the drawing; this spring aids in lifting the cabinet from the bed, and also assists in lowering, by checking the cabinet as it is dropped onto the bed. A leg is hinged to the lower edge of the other 18-in. side, to support the cabinet when lowered.

A pulley is fastened to the wall, above the cabinet, and a rope run through this, to a screweye driven into the cabinet as shown. This makes it possible to raise or lower the cabinet easily; another, but shorter rope, attached to the same screweye, is used to pull the upper part of the cabinet forward when it is desired to lower it, the patient keeping the other rope in the hand, and using it to lower the cabinet gently, when it has been pulled out of the perpendicular by the shorter rope. The hinged lid of the cabinet is provided with a lock, and may be used as a writing desk.

The telephone is attached to the head of the bed, on an extension bracket, within easy reach of the hand.

While this article is intended mainly to deal with the equipment necessary for a business of this kind, there are certain suggestions that may prove of help to those contemplating entering this field. Before starting on this work, the conditions in the town or territory in which the shut-in lives should be studied carefully. Lists of the households employing domestic help should be compiled; tactfully written letters to the persons employing such help will usually bring a response detailing such things as wages paid, hours of work, etc. This information should be card-indexed, and arrangements may be made whereby such employers will give notice of any prospective vacancy in their households. Advertisements must be inserted in the local newspapers, to get in touch with the help, and, once located, the agent should keep in touch, as closely as possible, with the applicant. These things are only suggestive, and domestic help is only used as an illustration; the method of attacking the problem will vary, but the same principle will apply.

If there are any factories in the neighborhood, these will usually have their own employment agents, but they should be approached, and an idea gained of the kind of help required, the hours, wages, etc.; it will probably be hard to break into this field, but if one or two good employes, carefully selected, can be supplied to a certain factory, respectful consideration of the service rendered may be confidently expected in the future.

Temporary help, homeworker's services, nursing service, and other work of the same nature, should all be investigated thoroughly, a list of reliable workers compiled, and homes solicited on their behalf. As the agent gains experience, more avenues of service will open up, until the business is finally a success.

On the information-bureau side, it will be necessary to build up a good library of books, magazines, trade journals, etc. A study of the questions-and-answers department in the women's pages of the metropolitan newspapers will indicate the general trend of the queries to be expected from women. These queries and answers should be carefully indexed and filed. For men, the problem is a little more difficult; if the community is a farming one, the bulletins of the Bureau of Agriculture and the farming papers will prove mines of information, and, while many farmers read these, only a few file the information for future reference. A good file once built up, an advertisement in the local papers offering information along these lines, should bring results, perhaps slowly at first, but growing in volume as the extent and reliability of the information are appreciated.

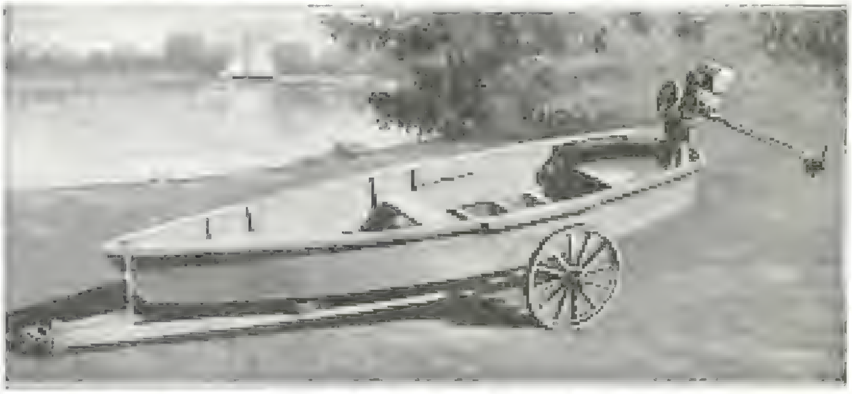
The ideas herein outlined are capable of almost indefinite expansion, and, intelligently applied, will lead to a life of cheer and service for any shut-in, with adequate financial reward.

Cleaning Rusty Crosscut Saws

An excellent method of cleaning and polishing an old rusty crosscut saw is as follows: Drill a vertical hole in the center of a small stump, and also saw a cut across it, passing through the hole; the depth of this cut should equal the width of the saw, minus the teeth. Invert the saw in the cut, allowing the teeth to project above the surface of the stump. Fill the hole around the saw with fine sand and moisten with a little water. By working the saw as if sawing, it will quickly be scoured as clean and bright as when new.—J. L. Jackson, Bass, Ark.

Auto-Trailer Rowboat Truck

During the dry days of summer, many rivers are reduced to shallows and pools, and to reach a good fishing or bathing location, without having to push or pull the boat over the shallows is impossible. Having this in mind, the rowboat truck illustrated was made from the front axle of an old automobile, to which two boards were bolted; the outer ends of the boards were bolted together, as shown. Crosspieces were nailed to the boards to serve as a cradle for the boat and prevent it from working out of position. The boat is placed on the truck so that most of the weight is supported by the axle instead of the planks. This truck is easily fastened to the rear of an automobile and hauled at fair speed over average roads to a place where the water is deep enough for the engine.—A. E. Granville, Barbourville, Ky.



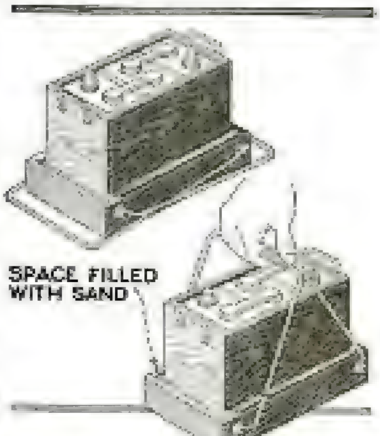
When Summer's Heat Dries Up the Streams So That Deep Water must be Sought Elsewhere, the Boat can be Loaded onto This Truck, Hitched behind an Auto, and Hauled to the Nearest Deep Water

Lamp Shade for the Photographer

The photograph shows an improvised lamp shade for use in a photographer's dark room when developing prints. The shade is made from an amber-colored bottle, with a neck large enough to admit the end of a lamp socket. On some bottles the flange on the neck fits nicely in a common shade holder. The bottom of the bottle is removed and the rough edges are ground down, to prevent injury. The bottle may be cut in several ways: A carborundum disk having a thin edge, if kept wet and rotated at a high speed, will cut heavy glass, but the bottle must be fed against the wheel very gently. A better way is to make a file mark—clean but not very deep—around the bottle and heat it with a long slender flame while slowly rotating the bottle. It is very important that the gas flame should not spread over the surface of the glass, for it is only the file mark that should be heated. A mere glancing touch is sufficient, and the glass will usually crack off in a very clean cut. Sometimes a fine platinum wire is wound around in the file mark and heated by an electric current. Less common is the trick of wrapping a strand of cord, soaked in kerosene, around the mark and igniting it. The principle is the same in each case. The unequal heating of the glass causes it to break, and, of course, it breaks at the weakest point—the file mark.—Paul J. Garvey, Chicago, Ill.

Preventing Damage from Storage-Battery Acid

Storage batteries, used for radio purposes, are often set on the carpet or on the varnished and polished floor, and, while this may be unavoidable, it is not advisable to take chances of having the rug or the floor finish ruined by any acid that may accidentally be splashed out, or that, in case of old batteries, may seep through the bottom. This danger is eliminated by the use of a shallow wooden box filled with sand, in which the battery is set, as shown in the drawing. A pair of handles, made of stout wire, are attached to the box to facilitate lifting and carrying the battery. Any acid that seeps through the battery case will be absorbed by the sand.



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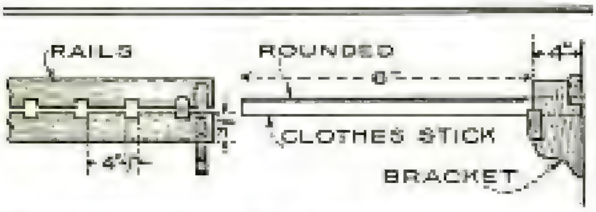
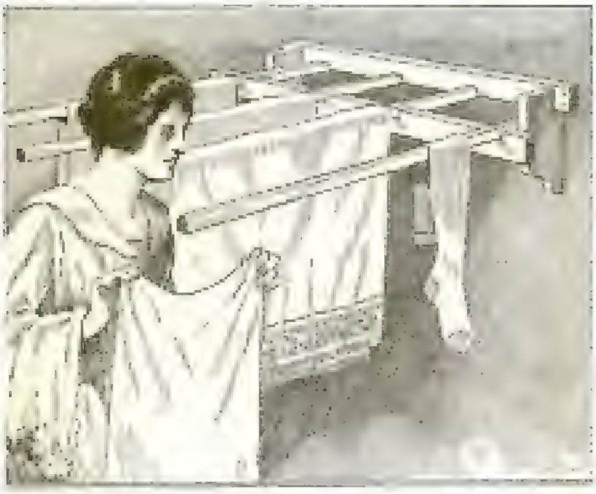
Simple Clothes-Drying Rack

The simple wooden clothes rack illustrated consists of two 1 by 3½-in. rails, held together at their ends by small





Clothes Rack for Drying Clothes Indoors That will be Found of Great Convenience to the Housewife: The Sticks may be Removed in a Moment

brackets. The rails are notched to receive the clothes sticks, and may be made any length desirable; they are fastened to any convenient wall or partition, about 5 ft. above the floor. The clothes sticks are made of 1 by 1¼-in. poplar, and are 6 ft. long, the part extending beyond the rails being rounded on top. When removing the clothes, all that is necessary is to draw the stick out of the bracket and allow the clothes to slide off into a basket.—M. E. Duggan, Kenosha, Wis.

Repairing a Fountain Pen

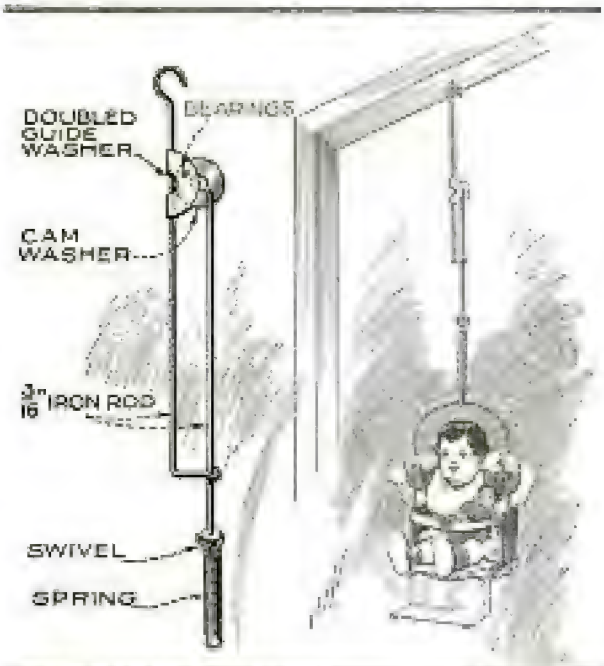
To repair a split fountain-pen barrel or cap, coat the section to be repaired with shellac, covering the barrel or cap all the way around. Then, before the shellac sets, wrap this section with silk thread as uniformly as possible, and with all the tension that the thread will stand, making no provision for the ends of the thread except to smooth them down well in the setting shellac. After the shellac is dry, which only takes a few minutes, the job is finished by covering the section with another light coat of shellac, using the fingers in both cases to apply it. The section thus repaired will be the strongest part of the pen, and, if it should be the barrel, it will be absolutely leak-proof. If the shellac used is too heavy, it will not make a neat job, and if it is too light, it will set before it can be wrapped; it should have the consistency of flowing varnish.—E. H. Taylor, Howell, Tenn.

Adjustable Hanger for Baby's Swing

The adjustable hanger shown in the drawing is adapted for the common baby swing of canvas, and is well worth making for mother's convenience as well as baby's safety.

It is made of two lengths of 3/16-in. iron rod, bent to the shape indicated. One of the rods is fitted with a swivel, to which a coil spring is attached. The clamp consists of two washers: a guide washer that is doubled to slide over one rod, and a cam washer that is riveted loosely between the sides of the guide washer, as shown. The rod that has the coil spring attached to it is bent at the upper end and riveted loosely in a hole drilled in the cam washer, so that the weight of the swing, with its occupant, will force the washer tightly against the other rod.

The hanger must be made accurately, so that the guide will slide freely, and it may be made any desirable length, although one measuring 18 in., when closed,



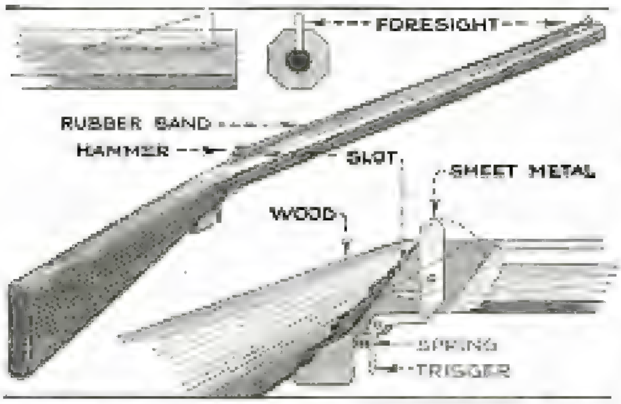
Adjustable Hanger for the Baby's Swing That Is Entirely Safe and Proves a Great Convenience for the Mother: It Locks Itself Tightly

has been found most convenient.—A. L. Long, Springfield, Ill.

A "Safety-First" Toy Gun

There is probably nothing that appeals to the average boy quite so much as a gun. However, a real gun is a dangerous thing to put into the hands of a small boy, and it is not by any means safe even for a larger one. Even the toy air gun is not safe, as the small bullets shot with it may easily destroy the eyesight. A very inexpensive and serviceable toy gun, and one that is quite safe, is shown in the drawing; it can readily be made from a length of 1-in. pine board and a few pieces of sheet metal.

The board is shaped to the form of the gunstock and barrel, and a slot cut through it, as shown. The foresight, trigger, and hammer are made of metal. Any kind of soft metal that can be cut easily with a hacksaw or cold chisel is used; brass, from 1/16 to 1/8 in. in thickness, is perhaps preferable. A groove to hold the foresight, is cut in the point of the barrel, and the hammer and trigger are pivoted on pins driven through the stock. A small coil spring, set in a hole drilled in the butt, forces the trigger forward, so that the gun can be cocked like any other gun. A rubber band is hooked over the foresight and stretched back over the cocked hammer, and the gun is then loaded. When the trigger is pulled,



A "Safety-First" Toy Gun That Uses Rubber Bands as Ammunition: It Is Easy to Make, Shoots Quite Accurately, and Is Not Dangerous

the rubber band pulls the hammer forward, and slips off, and the sudden release of the tension propels the band forward with considerable force. The length of the barrel and the strength of the rubber band determine the distance that the band is thrown. The gun can be used for target practice, and will shoot quite accurately. Fly shooting with a gun of this type has been found to be an alluring pastime for the youngsters, and one that develops real skill.—H. H. Siegele, Emporia, Kan.

Weed-Pulling Fork for Hoe

Long-rooted weeds often grow so close to potato and tomato vines in the garden

Simple Fork Attachment for a Garden Hoe, That Enables Weeds to be Uprooted without the Danger of Cutting Near-By Plants

that they escape notice until they have attained considerable height. As such weeds are often in a position where they cannot easily be reached with an ordinary hoe without endangering the plants, the attachment illustrated for uprooting them was devised, and found to be a practical and back-saving tool.

A piece of 3/8-in. round iron rod is bent to the shape shown, to form a two-pronged fork. This fork is flattened and drilled at the points indicated. Corresponding holes are drilled in the blade of the hoe, and the fork riveted to the blade.

In use, the weed is gripped between the prongs of the fork, and the handle of the hoe pulled down, the edge of the hoe blade acting as a fulcrum. In this way the most stubborn weeds are uprooted. It takes only a short time to make the attachment.

Converting a Kerosene into a Gas Heater

A kerosene heater of the common type can readily be converted into a serviceable gas heater. Remove the oil receptacle and wick, and fasten a circular stove gas burner in position with wire. The gas burner can be purchased at small cost, and furnishes considerable heat.

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Detector and Two-Step Amplifier for Dry-Cell Tubes

BY F. L. BRITTIN

THE introduction of the dry-cell tube has made possible the operation of tube detectors and amplifiers without the use of a storage battery, and enables those who, because of the trouble incident to the use of a storage battery, have been obliged to content themselves with a crystal detector, to build a set that will give every satisfaction.

The detector described in this article is designed as a separate unit, for those who do not wish to expend a great deal of money at the start; the two-step amplifier can be added at any time. The results obtained with these instruments are excellent; on a detector and two-step amplifier of this type, practically all of the large broadcasting stations in the country have been received in Chicago. The cost of the instrument is very reasonable, that of the detector being approximately $25, including batteries, tube, and phones, and of the complete instrument approximately $58. These figures may vary a little in different localities, but, as none but standard parts are used in the instruments, they will be found very close to actual cost.

The instrument is one of the simplest it is possible to make, as there are no coils to wind or tap, and no switches to mount. The inductance used is a 75-turn honeycomb coil, and tuning is accomplished by means of a 23-plate "vernier" condenser; the wave-length range is from 150 to 500 meters.

The panel used for the detector is 3/16 by 6 by 9-in. bakelite, laid out and drilled as shown in Fig. 1. The panel is screwed to the base, which may be any piece of lumber 3/4 by 6 by 9 in. in dimensions; it is best to attach the panel to the base by means of angle brackets—shelf brackets will serve excellently for this. It is a good idea to stain and varnish the base, to add to the appearance of the finished instrument.

The tube socket may be either of the types shown in Fig. 2; it is fastened to the base directly behind the 9/16-in. ports in the panel. The grid leak is also screwed to the base; this is of the standard 2-megohm type, but, if this is unobtainable, a piece of bristol board, 3/4 by 2½ in. in size, can be used instead. A pencil mark is drawn down the center of the bristol board, and brass wood screws are used to fasten it to the board, taking care to see that the screw heads make good contact with the pencil mark before wiring and screwing down tight.

The rheostat is mounted at the left of the panel, below the ports, as shown in Fig. 3, and the mounting for the honeycomb coil at the top of the panel, in the center.

The 23-plate vernier condenser is fastened to the right-hand side of the panel; this must be of the type specified, as the selectivity of the detector depends entirely upon this condenser.

The grid condenser is of standard type, of .00025-mf. capacity, preferably with mica insulation, and may be mounted anywhere found convenient.

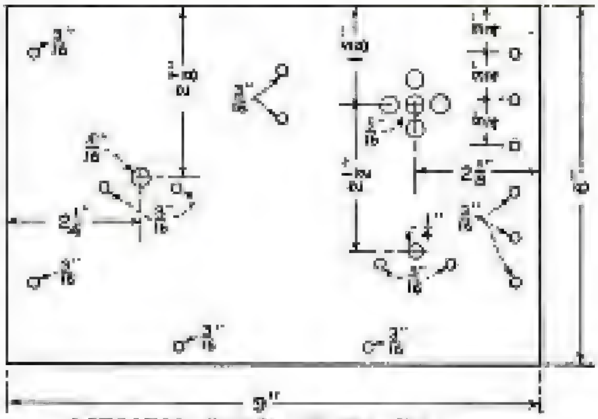
The binding posts for aerial, ground, B-battery, phones, and dry cell are finally screwed in place. It is a good plan to put small brass or copper lugs behind these posts, and to solder the wires to the lugs.

The instrument is wired with No. 14 tinned-copper wire; the wiring can be covered with "spaghetti" tubing, if desired, or it can be left bare—busbar-fashion—as shown in the photo, Fig. 5. Every connection must be well soldered, using soldering paste, resin, or resin-cored solder; never acid, or acid-core solder.

The B-battery is a 22½-volt unit, and is connected to the two posts in the upper left-hand corner of the panel, Fig. 3. The phones are connected to the two posts directly below; these should be of a good make, and of not less than 2,000 ohms' resistance. The dry cell is connected to the two lower posts, the positive, which is always the center post of the cell, to the lowest post, and the negative to the one above.

The aerial used is of the ordinary type. If one wire is used, it should be 125 to 150 ft. long; if a two-wire aerial is used, it need not be more than 60 or 70 ft. long, constructed in the usual manner. In either case, the aerial should be 40 to 50 ft. above the ground for best results. The ground wire from the instrument is led to a water pipe, the pipe filed bright, and the wire fastened to it with a ground clamp. Instructions for installing aerials are given on page 814, in the May, 1923, issue of this magazine.

The panel for the two-step amplifier is 3/16 by 6 by 12-in. bakelite, and the layout of the holes is shown in Fig. 7. The panel is laid out first, drilled, and the jacks and rheostats are mounted in place. It should be noted that two of the jacks, on the right-hand side, Fig. 8, are of the two-circuit type, and the one on the left, that for the second step of amplification,



DETECTOR-PANEL TEMPLATE
Fig. 1

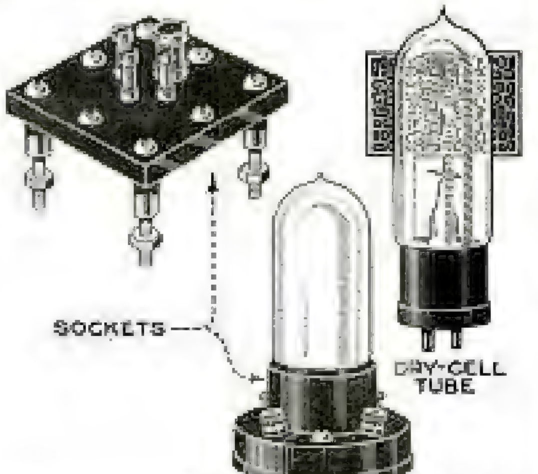
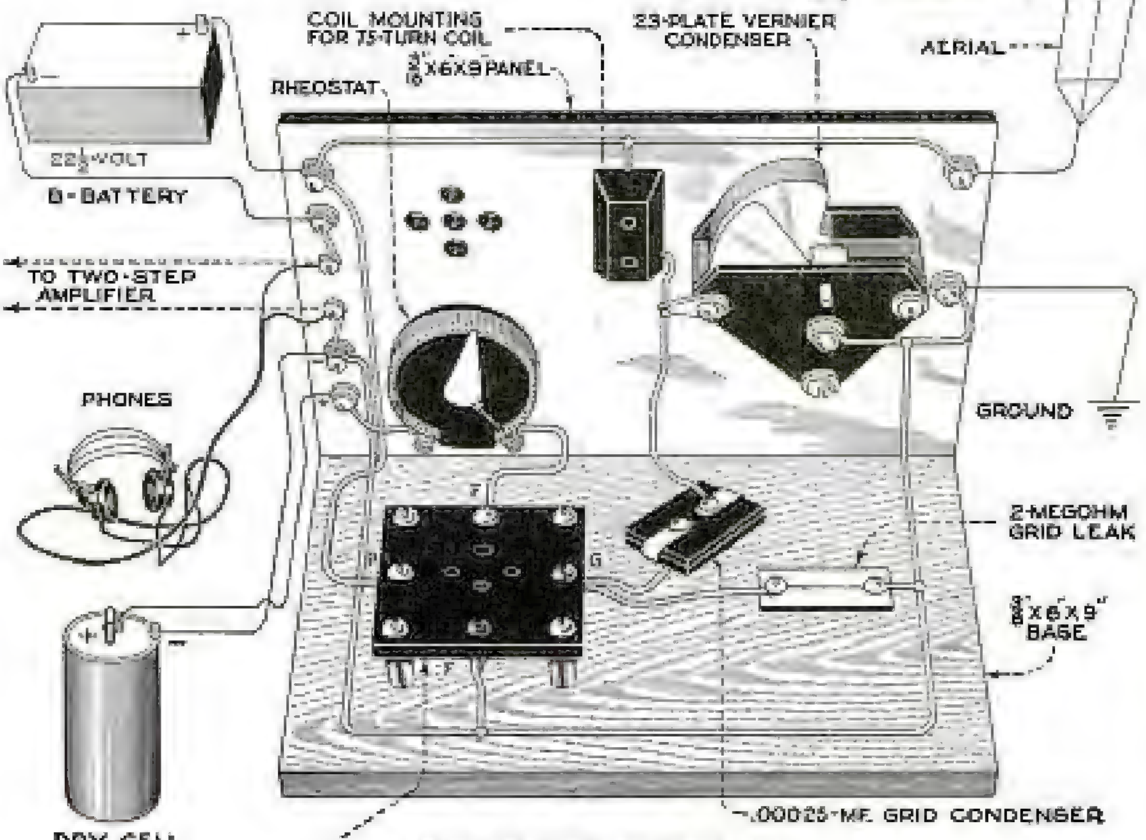


Fig. 2



REAR VIEW OF DETECTOR SET FOR DRY-CELL TUBES
Fig. 3

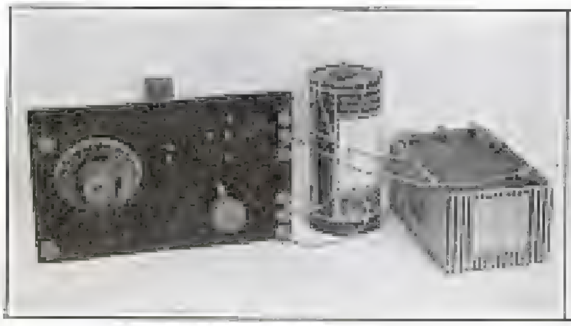


Fig. 4

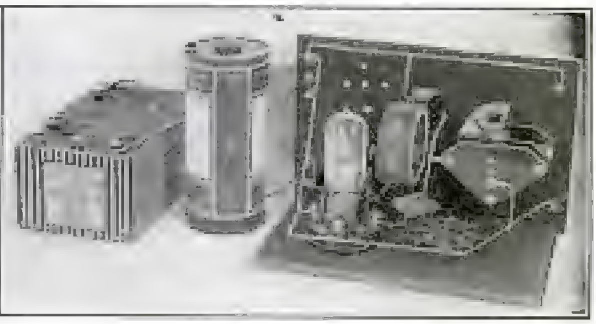


Fig. 5

Figure 1, Template for Laying Out Detector Panel; Figure 2, Dry-Cell Tube and Sockets; Figure 3, Rear View of Detector Panel, Showing Location of Instruments, Battery and Phone Connections, and Method of Wiring; Figures 4 and 5, Front and Rear Photos of Completed Detector, with Batteries, Ready for Operation as Soon as the Phones are Attached

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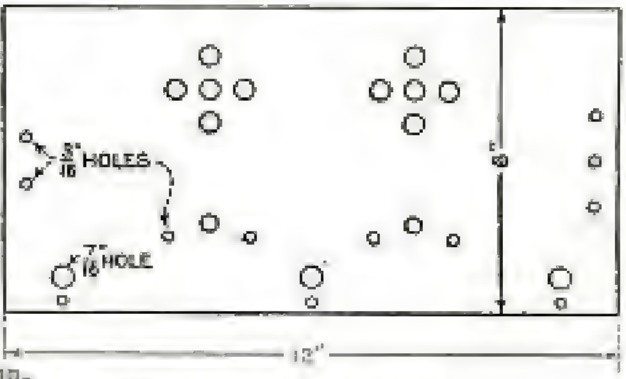
Fig. 6



AMPLIFIER-PANEL TEMPLATE

Fig. 7

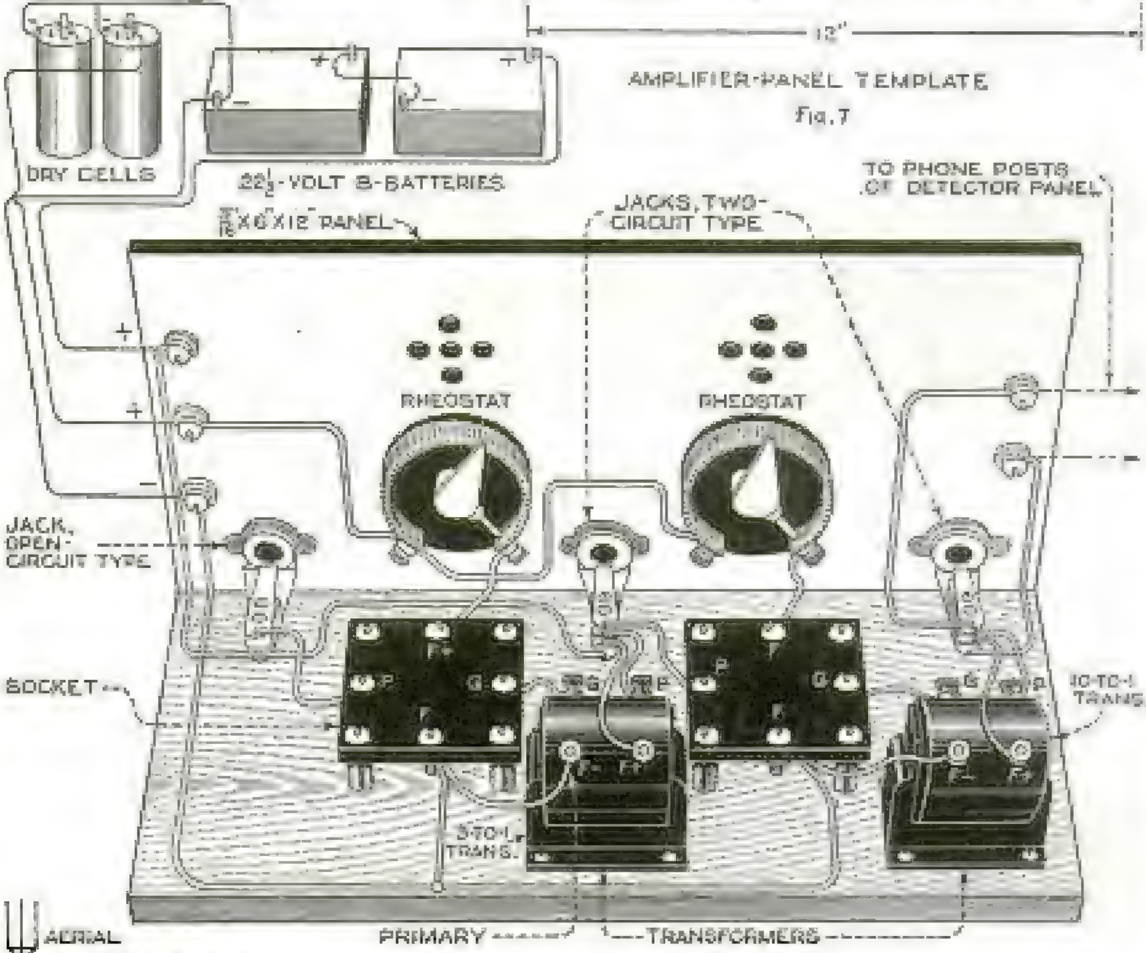


Fig. 8

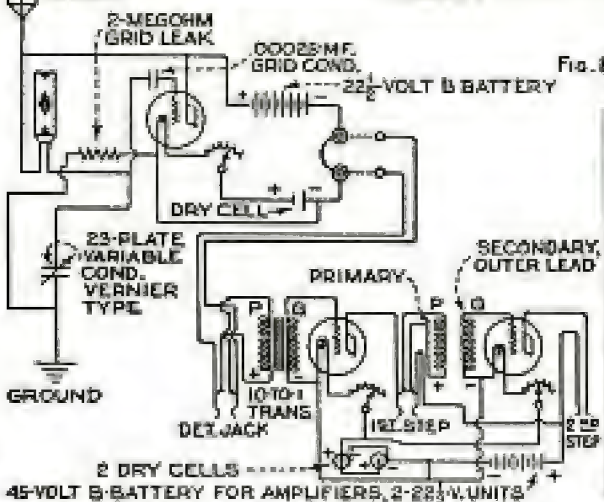


Fig. 9

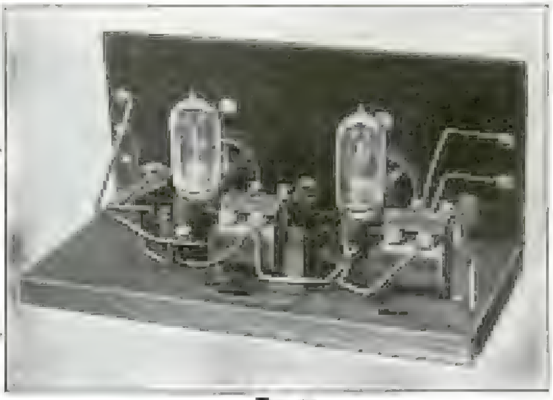


Fig. 10

Figure 6, Front View of Completed Amplifier Unit; Figure 7, Template for Drilling Panel; Figure 8, Rear View of Amplifier Assembly; Note Especially the Method of Connecting the Batteries; Figure 9, Wiring Diagram for Detector and Two-Step Amplifier; Figure 10, Photo Showing the Back of Completed Amplifier

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is of the single or open-circuit type. The transformers and tube sockets are mounted on the base, which is a 3/8 by 6 by 12-in. board. The transformer for the first step is a 10-to-1 audio-frequency transformer, and the one for the second step is of the same type, but the winding ratio is 3 to 1. The transformers in the drawing are marked just as they will be found on the majority of transformers, so that no difficulty should be encountered in wiring; F stands for filament, G for grid, and P for plate. If any trouble should occur, due to different markings on the builder's transformers, a reference to the circuit diagram in Fig. 9 will make it clear.

The binding posts at the left of the panel, Fig. 8, are for the batteries. Two dry cells are used, one for each amplifying tube, and are connected in parallel, so that, while the voltage remains the same as that of a single cell, the amperage is increased. The dry-cell, or "peanut" tube, as it is popularly called, operates at 1.1 volts—the voltage of one dry cell. The positive lead from the cells is connected to the center post; the negative lead is connected to the negative terminal of the first of the 22½-volt B-batteries, shown above the panel.

The B-batteries are connected in series, the positive lead being connected to the upper post on the panel, and the negative lead to the lowest post.

When the wiring has been done, the instrument is complete. If the builder desires, he can, of course, place each unit in a cabinet, or combine them in one cabinet, but this is not necessary.

To connect the detector to the amplifier set, all that is necessary is to disconnect the phones from the former, and to connect the phone posts on the detector straight across to the corresponding posts on the amplifier, as indicated by the dotted lines in Figs. 3 and 8, and in the wiring diagram, Fig. 9. The phone-lead terminals are then removed, and plugs substituted for them. The detector batteries remain exactly as they were.

To operate, put on the phones, turn the detector-tube rheostat until a hissing sound is heard in the receivers, then adjust the condenser until the signals "come in." If the amplifier is connected, the phones will be plugged into the first jack. Now plug in at the second jack, and turn the first amplifying-tube rheostat until the signal is loud, but clear; this is usually loud enough for comfort when listening to near-by stations. Distant stations will require the use of the second step, which is operated in exactly the same way as the first. A loud speaker can be used on the second step.

MATERIAL LIST

1 bakelite panel, 3/16 by 6 by 9 in.	$1.08
1 bakelite panel, 3/16 by 6 by 12 in.	1.44
1 baseboard, 3/8 by 6 by 9 in.	
1 baseboard, 3/8 by 6 by 12 in.	
3 dry-cell tube sockets	$ .75 to $1.00 each.
3 dry-cell tubes	6.50 each.
3 rheostats	.75 each.
1 23-plate vernier condenser with dial	$4.00 to $5.00
1 75-turn honeycomb coil	1.00
1 honeycomb-coil mounting	.60
1 .00025-mf. grid condenser	$ .35
1 2-meg. grid leak	.75
2 two-circuit jacks	$ .90 to $1.00 each.
1 open-circuit jack	.60 to .70 each.
1 10-to-1 audio-freq. transformer	$4.50
1 3-to-1 audio-freq. transformer	4.50
3 dry cells	$ .40 each.
3 22½-volt B-batteries	$1.75 to $3.00 each.
1 pair 2,000-ohm phones	$4.50 up.
25 ft. No. 14 tinned-copper wire	.25
4 3-ft. lengths spaghetti tubing	.17 each.

Renewing Old Rugs

Brussels or Axminster rugs, known as "pile" rugs, have a very hard finish on the underside when they are new, but after they have been used for some time they soften. This is true particularly of the smaller rugs, perhaps because they are subjected to more frequent and vigorous shakings, and they then become annoying because of their tendency to wrinkle, which causes them to wear out soon, the threads breaking along the folds.

Some years ago a dealer in rugs told me that it was a wise plan to have the backs of rugs renewed occasionally with a glue preparation to lengthen their life. Having some small rugs that were worn, I decided to experiment with them. I found a package of some wall "sizing" in the house and proceeded to dissolve it according to directions, but made the solution thicker than usual so that it would not penetrate the rugs. I then placed the rugs face down on the floor, and spread the solution on the back with a broad, flat brush. When the rugs were dry, they lay as flat and firm as when new. It is sometimes necessary to stretch the rugs and tack them down on the floor until dry, as they must be kept flat. —Stella Henderson, Lake Mills, Ia.

Convenient Cupboard Stepladder

The stepladder for the kitchen cupboard shown in the drawing proves very handy for the housewife, as it fits in the

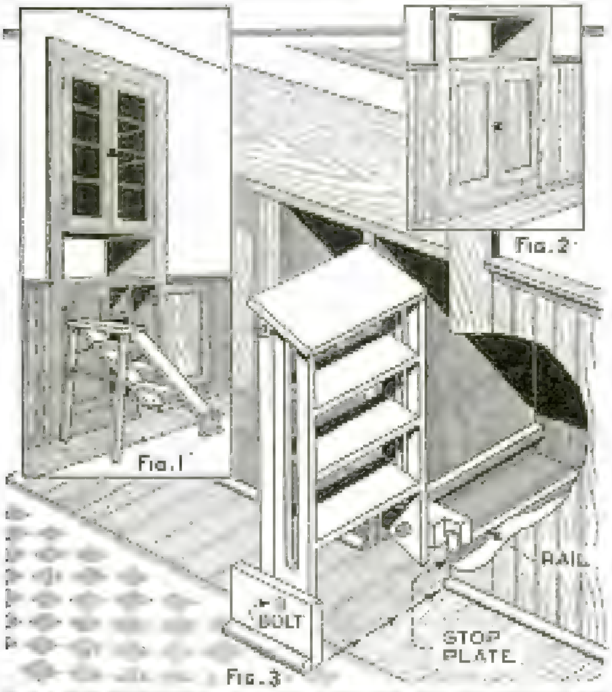

Figure 1, Ladder Ready for Use; Figure 2, Outside of Lower Section of Cupboard Containing Ladder; Figure 3, Ladder Folded to Slide into Recess

lower part of the cupboard when not in use, and can be drawn out and opened in a moment when needed.

A space, about 6 in. wide, is partitioned off in the lower cupboard, to hold the ladder when folded. A small stepladder that will fit in this space is made, or one can be purchased and fitted in. To the inside leg is bolted a wooden block, shaped as shown; this block slides on two strips of wood nailed to the sides of the compartment. The leg and block are bolted together loosely to permit the former to move freely. Part of the baseboard is then cut out and bolted loosely to the other leg. It is a good idea to reinforce this piece of baseboard, as it is otherwise likely to break. When the ladder is put in the cupboard, as shown in Fig. 2, the cut-out piece is in line with the rest of the baseboard, as in Fig. 2. When the ladder is pulled out and unfolded, as shown in Fig. 1, the steps are situated conveniently under the shelves above.

Shipping Berries by Mail

The usual plan for sending any variety of berries through the mail, by parcel post, is to put up the berries in small paper bags, and fit the bags into shallow, square cartons. The arrangement works well, but considerable time is required for proper packing. The following method saves a great deal of time and is entirely satisfactory: Fill the berries into divided pasteboard egg cartons, which are made to hold a dozen eggs each. The berries ship well in this manner, if they are shaken down gently.

Heating Water with Oil Stove

A simple homemade water-heating attachment for an ordinary oil stove can be made up at little expense. The attachment consists of a water tank and a length of 1/4 or 3/8-in. copper tubing, arranged as illustrated. Two coils are formed near the center of the tubing. The diameter of the lower coil should be a little greater than the diameter of the wick of the stove, and that of the upper coil a little smaller. The ends of the tubing are attached to a can of several gallons' capacity, or to a small watertight barrel. The connections can be made with the parts of a discarded gas headlight of an automobile, or if these are not available, with similar plates made of flat iron, drilled as shown. One plate is soldered on each pipe near the end, and the other plate bolted to it on the inside of the tank, after the end of the

A Water-Heating Attachment for the Oil Stove, with Which Several Gallons of Water can be Heated to the Boiling Point in a Very Short Time

tubing is passed through the tank side. Packing is, of course, used to prevent leakage.

A slot, just large enough to admit the tubing, is cut in the side of the stove, upward from the lower edge, to allow the upper part to swing back freely, which is necessary when lighting it. The water

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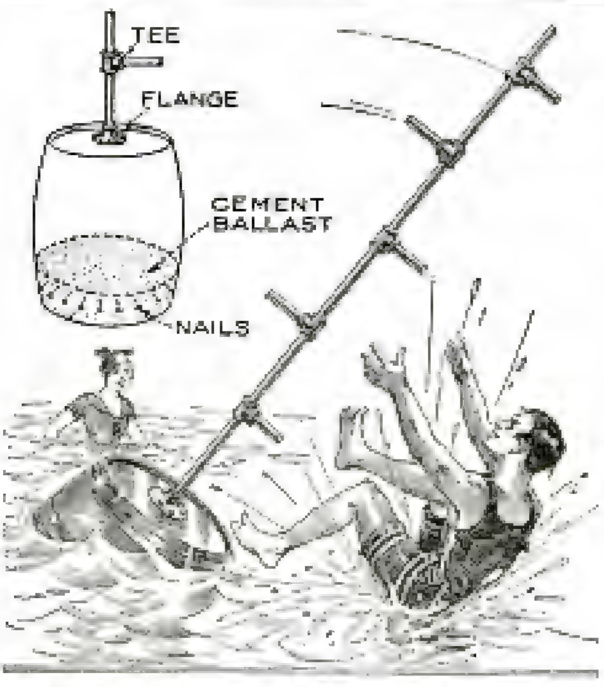
tank is placed on a wooden box or low stool to bring it to the correct level. The lower part of the tubing must be perfectly horizontal and enter the tank near the bottom. With this arrangement, water can be heated to the boiling point in a short time.

"Tumbling Barrel" Provides Sport for Bathers

A novel device that is popular at a Wisconsin bathing beach is shown in the illustration. An empty vinegar barrel, of about 50-gal. capacity, is filled with cement, to the level indicated, after nails have been driven through the sides to keep the cement in place when set. The bunghole is tightly plugged, and a 1-in. pipe flange is screwed to the center of the upper end. Into this flange a 10-ft. "ladder," made of tees and long nipples, is screwed, which completes the device.

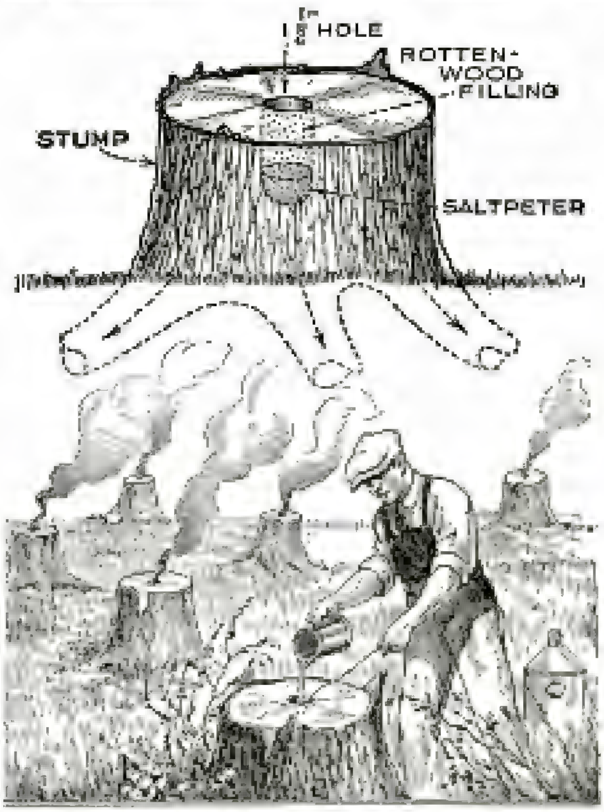
When placed in the water the "tumbling barrel," as it is called, floats with the upper end about 1 ft. above the surface of the water. The trick that affords so much amusement to the bathers is to mount the barrel and climb as far up the mast as possible before the barrel tips. The cement ballast of the barrel maintains the equilibrium of the "tumbler" as long as the bather stands upon its top, but any attempt to climb the mast results in some amazing gymnastics—and an eventual ducking



A Novel Device Called the "Tumbling Barrel" That Is Popular at a Wisconsin Bathing Beach: The Trick Is to Preserve the Balance While Climbing the Mast

Burning Out Stumps Effectively

When clearing land of stumps for farming purposes, it is desirable to have the soil free from all roots as well as the stumps. When the stumps are pulled,



Effective Method of Burning Stumps: An Injection of Saltpeter Enables the Fire to Creep to the Ends of the Roots, Until They are All Consumed

the roots often break off. Some of these are overlooked and remain in the ground, and this, of course, is highly objectionable, as they will catch on the plowshare.

A good method of clearing land of stumps is to burn them out with the aid of saltpeter. Saltpeter, if so applied as to penetrate into the heart of a stump properly, will in a year's time reach down to the very ends of the roots. During the summer, when the stumps are thoroughly dry, drill a 1½-in. hole, about 3 or 4 in. deep, in the center of the stump, as indicated. Into this hole put 3 tablespoonfuls of saltpeter; then close the hole with decayed wood and dirt. During the following summer, dig out the dirt, fill the hole with kerosene, and set the stump on fire. It will burn slowly but surely, and will keep on burning under the ground until every piece of root is consumed. The action of the saltpeter makes a slow-burning match of the fibers of the roots, and carries the fire wherever it has penetrated.—J. V. Romig, Allentown, Pa.

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A Homemade Statoscope

The statoscope is a simple form of aneroid barometer that is very sensitive to small changes of air pressure. It will readily detect the difference in barometric pressures of two levels 5 ft. apart, and will demonstrate that the air pressure is greater at the feet of a standing person than at his head.

A homemade statoscope may be constructed as follows: Take a length of glass tubing having a small bore, open at both ends, and, by means of a gas flame, bend it to a U-shape, as shown in the photograph. Suck a few drops of water or oil into the tubing, just enough to fill a part of the length between the bends. Now insert one end of the tubing into the interior of an empty vacuum bottle of 1-qt. capacity, by forcing the tubing through a tight-fitting hole in the cork. Vaseline should be used on the tube to insure an air-tight connection. The bottle should be suspended, by cords, upside down and absolutely plumb, so that no motion of the water may occur due to the instrument being tipped.

The air in the bottle is separated from the outer air by the water "plug" in the tubing. Any change of volume of the air in the bottle will therefore be registered by a motion of the water plug. Only two factors will change the volume of the air in the bottle: change of temperature and change of pressure. By using a vacuum bottle as a container, temperature changes will not affect the statoscope appreciably, except over long intervals of time. There remains only the influence of a change in pressure of the atmosphere, transmitted to the air in the bottle by means of the water plug or piston.

For small changes of atmospheric pressure, the relative change of volume of the air in the statoscope is equal to the relative change of pressure in the external air. If the barometric pressure changes by 1 part in 40,000, the volume of the entrapped air will change 1 part in 40,000 also, and, as 1 qt. of air approximates 69 cu. in. in volume, the water plug in the tubing will move a little more than ½ in., if the diameter of the bore in the tubing is ⅙ in. This corresponds roughly to the change of pressure accompanying a change of elevation of 6 ft., for elevations less than 1,000 ft. above sea level.

If two enlargements, or bulbs, are blown in the tubing, as shown in the photograph, the water will not be driven entirely out of the tubing by great changes of pressure; air will simply bubble into or out of the flask for continuously increasing and decreasing pressures, respectively. As used in ballooning, if the bubble "breaks inward" the balloon is falling; if it "breaks outward" the balloon is rising. The rate at which the bubbles break is a measure of the rate at which the balloon ascends or descends. If the statoscope, with the enlargements in the tubing, is carried in an elevator, the number of feet change of level between successive breakings of a bubble serves to calibrate the device to read differences of level in actual feet. The device can be carried in an automobile winding its way up into the hills, and, from the counted number of times the bubble breaks, the rise in feet above the starting point may be ascertained. Of course, the number of feet elevation required to "break a bubble" varies with the actual elevation, so that the device should be calibrated in the region where it is to be used.

To take double precaution against temperature changes in the air within the statoscope, it is well to wrap the bottle in layers of felt. It is, of course, preferable to use a drop of oil in the glass tubing instead of water, as the oil does not evaporate.

Holding the Automobile Hood

The usual practice of raising one-half of an automobile hood and resting it on the edge of the dash is none too safe, as the vibration of a running engine, or any slight jar, will dislodge it.

To prevent this, cut a number of notches, about ¼ in. deep, along the edge of the dash, near the socket into which the hinge rod of the hood fits. These notches must be as close to the edge of the dash as possible, so that, when the hood is closed, the notches cannot be seen. When the hood is raised, its lower edge is set in one of the notches, to prevent it from slipping down.—L. B. Robbins, Harwich, Mass.

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PRIZE OFFERS AND ANNOUNCEMENTS

ONE-MILLION-FRANCS ENDURANCE PRIZE FOR AERIAL ENGINE

An international prize of 1,000,000 francs (normally about $200,000) is offered by the French Committee for Aeronautic Propaganda for the internal-combustion aerial motor showing the greatest endurance.

Application for the privilege to compete, however, must be made on or before Dec. 1, 1923. This should be accompanied by a sum of 40,000 francs, and a contribution of 10,000 francs for the test. Of the former sum one-half will be returned for motors passing the elimination tests. The latter sum will be returned only to competitors withdrawing their motors before March 1, 1924, on which date the tests are to begin.

For additional information address: Aviation Commission of the Aero Club of France, 35 Rue François I, Paris, France.

EXPOSITION OF VOCATIONAL SCHOOLS TO BE HELD IN CHICAGO

To arouse greater interest in vocational training and to give those who are contemplating taking up a trade or a vocation an opportunity to see "living" exhibits, demonstrating the various courses offered, an exposition of trade and vocational schools is to be held at the Coliseum in Chicago from May 30 to June 10. The schools planning to occupy booths represent a wide range of human activities. Among a partial list of 83 named, may be mentioned steam engineering, nursing, architecture, automotive electricity, masonry, office work, painting, bridge designing, dentistry, and engraving.

AMERICAN BALLOON RACE IS SET FOR JULY FOURTH, THIS YEAR

July 4 has been decided upon as the date of the national elimination balloon race starting at Indianapolis, Ind. At least 14 balloons will start, according to the National Aeronautic Association. Prizes will be awarded for the distance navigated, $1,000 going to the winner, $800 to second, $600 to third, and $300, $200, and $100 to fourth, fifth, and sixth finishing position, respectively. Three of the entries, it is said, will have craft of unusual design; and the army and navy air services will both compete. The contest is being promoted by the Aero Club of Indianapolis, and the Chamber of Commerce of that city.

AMERICAN-LEGION POST ESTABLISHES MEMORIAL SCHOLARSHIP

A memorial scholarship in honor of the dead of the 86th Division, has been established at the University of Chicago by Blackhawk Post, No. 107, of the American Legion. It will be awarded this year to the high-school student writing the best essay on the theme, "Why I Am Proud to Be an American."

The essay must be typewritten, and must reach room 705, 21 North LaSalle St., Chicago, Ill., on or before May 20, 1923. Five hundred words is the maximum length considered.

FINANCIAL AND INDUSTRIAL RESEARCH BASIS FOR ANNUAL CASH PRIZES

For the greatest original contribution on any subject relating to business development and the modern trust company, a prize of $2,500 is to be awarded in 1925, and a similar prize every three years thereafter, by the Chicago Trust Company. No restrictions are made as to the eligibility of the contestants.

Two other awards, of $300 and $200 respectively, to be presented annually for briefer studies, not exceeding 20,000 words, are also announced. This contest, however, is limited to bank employes, and to undergraduate students of economics, business, finance, or law.

The closing date each year will be August 31.

PURCHASING POWER OF CONSUMERS SUBJECT OF ESSAY CONTEST

Prizes of $1,500, $800, and $500 are announced by the J. Walter Thompson Company, of 242 Madison Ave., New York City, for the best essays on "A Statistical Index of the Purchasing Power of Consumers in the United States." It is hoped that the contestants will furnish material which will help in developing a more accurate measurement of the purchasing power of communities in this country.

The competition is open to all, the manuscripts may be of any length, and the closing date is Sept. 30, this year.

CIVILIAN ENGINEERING STUDENTS MAY CRUISE ON NAVAL VESSELS

The Navy Department, it is reported, has decided to offer to a limited number of leading universities and colleges, an opportunity to send two engineering students each to a cruising ship for a short time in the summer.

Commanding officers of the vessels will assign them to the ship's personnel, and then see that they are acquainted with the construction and operation of the machinery on board. It is expected that each student will have two weeks at sea.

DESIGN FOR SARAH BERNHARDT TABLET WANTED BY ORPHEUM CIRCUIT

For the best design of a memorial tablet to be placed on the tomb of Sarah Bernhardt, officials of the Orpheum Vaudeville Circuit, announce a prize of $250. Four other prizes, totaling $250, will also be given.

The sketches may be in ink or crayon, the idea rather than the execution being more important. Address J. J. Nash, manager of the Palace Music Hall, Chicago, Ill.

CONTESTS PREVIOUSLY ANNOUNCED

Medals, Diplomas, and Money Awards: Announced August issue, 1921; awards offered by the Franklin Institute. The Franklin medal is for workers in technology; the Elliott-Cresson is for original research work and invention; the Howard N. Potts is for important development of previous discoveries and inventions. Each award consists of a gold medal with a diploma. There are also a silver medal, and a Certificate of Merit awarded for meritorious discoveries, and cash premiums for certain work in optics.

One Million Francs for Best Motor: Announced January issue, 1922; closes June 1, 1923; address, Aero Club of France, Paris.

Best Treatise Regarding Immortality: Prize $1,000; announced January issue, 1923; closes Dec. 1, 1923; address, Contest Editor, 2 West 47th Street, New York City.

Awards to Further Science of Electricity: Medals and prizes, amounting in all to about $20,000; announced February issue, 1923. For particulars address General Electric Company, Schenectady, N. Y.

For Best Work by American Chemist: An annual award of $25,000; announced February issue, 1923; address the Allied Chemical and Dye Corporation, New York City.

Names for Great Lakes Steamers: Two prizes of $50 each; announced February issue, 1923; suggested names must reach the company before the opening of navigation season in 1924; address the Detroit and Cleveland Navigation Company, Detroit, Mich.

For Best Studies in the Economic Field: Four prizes from $1,000 to $200; announced March issue, 1923; closes June 1, 1923; address, Prof. J. Laughlin, University of Chicago.

Motorboat Race, Miami Beach, Fla., to Havana, Cuba: Prizes $10,000; announced March issue, 1923. Write Miami Chamber of Commerce.

Essay on Economic Subject: Prize $1,500; announced March issue, 1923; address the Simonds Economic Prize Contest, 470 Main St., Fitchburg, Massachusetts.

When answering prize offers please mention Popular Mechanics Magazine

Pulitzer Prizes, Columbia University: For best work in various literary and journalistic lines; announced April issue, 1923; nominations of candidates must be made before Feb. 1, 1924.

Scholarships for War Nurses and Ex-Service Men: Numerous scholarships provided at colleges and universities throughout the country under the will of the late La Verne Noyes; announced April issue, 1923; apply direct to colleges.

Most Practicable Device for Recording Mine-Shaft Signals: Prize of £250, or about $1,100; announced May issue, 1923; closes Sept. 30, 1923; address Rand Mutual Assurance Co., Ltd., P. O. Box 413, Johannesburg, Transvaal, South Africa.

Name and Slogan for Hats to be Worn by Middle-Aged Women: Four prizes; announced May issue, 1923; closes June 1, 1923; address Dept. 64, Gage Brothers & Co., 18 S. Michigan Ave., Chicago.

Boys' and Girls' Short-Story Contest: Two first awards of $100, and other prizes; announced May issue, 1923; address The Haversack and The Torchbearer, 810 Broadway, Nashville, Tenn.

Greatest Benefit to Community Rendered by Women's Club: Prize, $1,000; announced May issue, 1923; closes Sept. 15, 1923; address Club Editor, Pictorial Review, 222 West 39th St., New York City.

Historical Essay on Eastern Hemisphere: Prize $200; announced May issue, 1923; closes July 1, 1923; address the Secretary of the American Historical Association, 1140 Woodward Building, Washington, D. C.

Students' Essays on Municipal Government: Prizes $250 and $100 for postgraduates; $100 for undergraduates; announced May issue, 1923; address National Municipal League, 261 Broadway, New York City.

SCIENCE NOTES FOR DAILY USE

2085

FOOD RESEARCH BUREAU EXPLAINS VIRTUES OF STALE BREAD

Most housewives know that the warming of stale bread when not too dry results in a freshening up of the loaf. The Food Research Bureau, in a report pointing out the wholesomeness of the stale loaf, explains that, in baking, much of the moisture in the bread is held by the starch which has been gelatinized. As the loaf comes out of the oven, this starch jelly, distributed throughout the bread, contains all the moisture it can hold.

As the bread cools, the starch gives up some of the moisture, which is absorbed by the other constituents of the loaf, changing the crust from a brittle substance to one more pliable and soft, while the gluten of the crumb is given a toughness and firmness which as fresh bread it did not have. This accounts both for the staleness and for the good results of again heating it.

Wholesale bakers lose millions of dollars yearly through agreeing to take back stale loaves. This raises the price to consumers. Bread a day old is as nutritious as when freshly baked, the bureau asserts.

2086

SNEEZE GAS FOR USE IN ILLUMINATING GAS TO PREVENT SUICIDES

Introduction of a new sneeze-gas compound into illuminating gas, in order to prevent suicide by asphyxiation and deaths from accidental escape of gas in burners and stoves, was suggested recently by Gen. Amos A. Fries, of the chemical-warfare service. One part of it in 10,000,000 of illuminating gas would be sufficient for the purpose, General Fries declared.

No matter how determined the suicide might be, he could not refrain from sneezing so long that he could carry out his suicidal intent. The gas would also serve as a warning of escaping gas from stoves and burners. When the illuminating gas is burning, the sneeze-producing element is consumed without any effect on the room's occupants.

2058

TWO CHILDREN KILLED BY TOY BALLOONS

Two children have died recently as the result, one of a toy balloon being sucked down into the throat, and the other when a balloon burst in its mouth. The first case aroused the attention of the medical fraternity by reason of the fact that the balloon, lodged in the throat, became partially inflated by every breath drawn by the unfortunate child, resulting in its speedy suffocation. The second death occurred when the mother of the child, giving it a slight slap on the cheek, caused the toy to explode. The exact cause of death was not made plain, but physicians believed the rush of air from the burst balloon, passing into the child's throat, suffocated it.

Emergency treatment in such cases depends entirely upon the location of the object in the throat, it is explained. An immediate operation is the only hope in most cases, unless the object is so placed that it can be reached by a hooked instrument and withdrawn carefully from the throat so as not to injure the victim. Neither suggestion carries with it assurance of saving life.

2091

UNIVERSITY PROFESSOR FINDS THREE WORDS USED MOST OFTEN

The words "the," "and," and "to" are most frequently used of any in the English language in speaking and writing, Dr. Ernest Horn, of the University of Iowa, finds. From a study of many compositions and types of written material, Doctor Horn makes the deductions that 300 words make up 75 per cent of all used in common speech and writing; 1,000 words form 90 per cent; 2,000, more than 95 per cent; 3,000, 98 per cent; 4,000, 99 per cent, and 6,000 make up 99½ per cent.

Ten words form more than a fourth of all these used, Doctor Horn asserts. These are, in addition to the three already noted, "you," "of," "he," "in," "we," "have," and "it." He has also selected a group of 100 words which, he believes, form 58 per cent of all that are used.

2094

FAT MEN STAND HIGH TEMPERATURES BETTER THAN THIN ONES

That fat men endure high temperatures and humidity better than thin ones has been proved to the satisfaction of a group of scientists who recently undertook a study of the effects of these two natural agents on the human body. In the course of their investigations they also blasted the popular theory that drinking iced water following exposure to high temperature caused serious and sometimes fatal cramps.

The experiments covered a rather extended period of time and were conducted by the American Society of Heating and Ventilating Engineers, the U. S. Bureau of Mines, and the Carnegie Institute of Technology. The scientific object was to determine what would be the right temperature and degree of humidity in a room most comfortable to a human being.

One of the important results of the study was the discovery that the human body can withstand great variations in temperature without seriously bad effects. Also, it was learned that the faster beating of the heart of a person in a heated room is responsible for discomfort more than the heat itself. Again, it was learned that sweat is the chief factor causing sore eyes when one becomes heated.

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A telephone personality

In your face to face contacts with people, your appearance, your bearing and many other things help you to make the right impression. But in your telephone contacts there is only one thing by which you can be judged—your speech.

An effective telephone personality is to-day a business and social asset. Everybody appreciates the person who speaks distinctly and pleasantly, neither too fast nor too slow, with a clear enunciation of each word, with lips facing the mouthpiece and speaking into it. In business, this is the telephone personality which induces favorable action on the part of the listener. To the salesman it may mean the difference between an order and no order; between an interview granted and an interview refused.

Curiously enough, people who are careful to make themselves effectively heard and understood face to face, often disregard the need for effectiveness in their telephone speech. Perhaps they shout, perhaps they mumble, perhaps they hold the mouthpiece far from their lips. And frequently they never realize that their carelessness has defeated the purpose of their talk.

The Bell System maintains for telephone users the best facilities that science, modern equipment, skilled operation and careful management can bring to telephone speech. But these facilities can be fully effective only when they are properly used.

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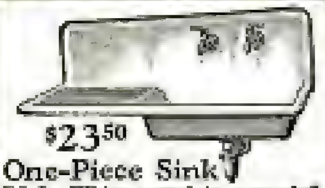

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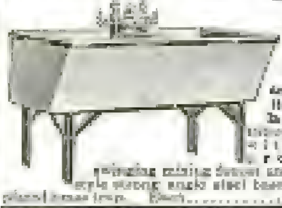
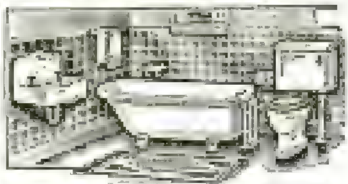


PJ-4—Composition enameled [illegible] 2 part laundry [illegible] swinging mixing faucet and latest style strong angle steel base; nickel plated brass trap. Each.....[illegible]



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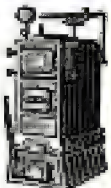

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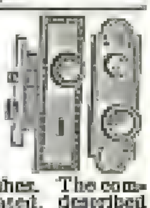

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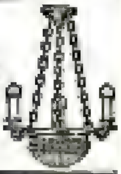

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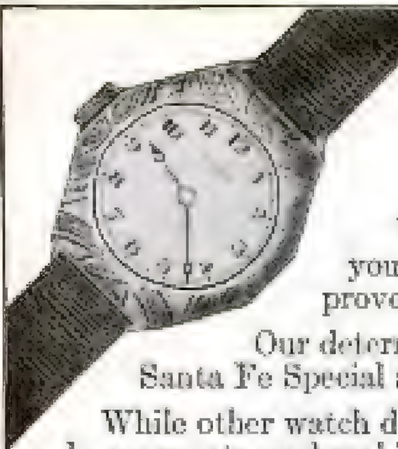

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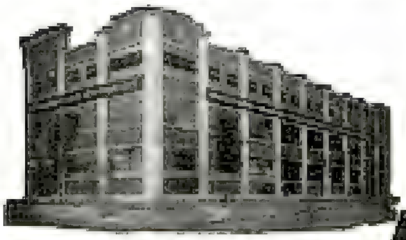

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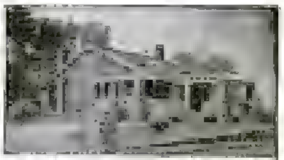

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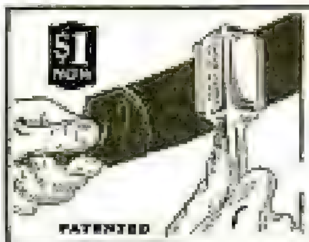

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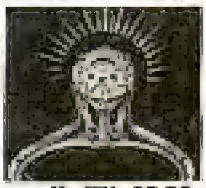

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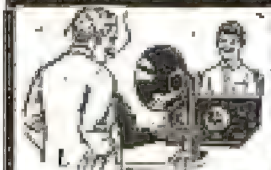

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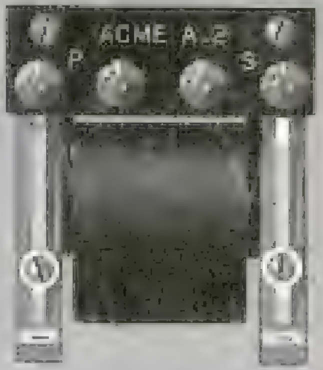

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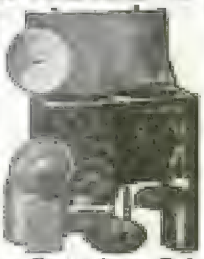

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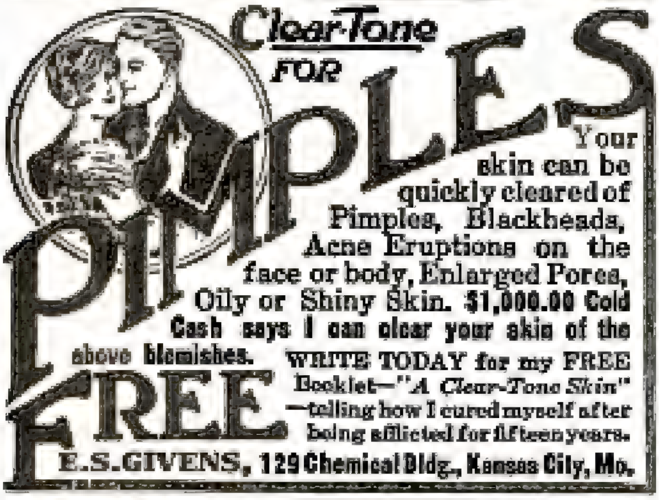

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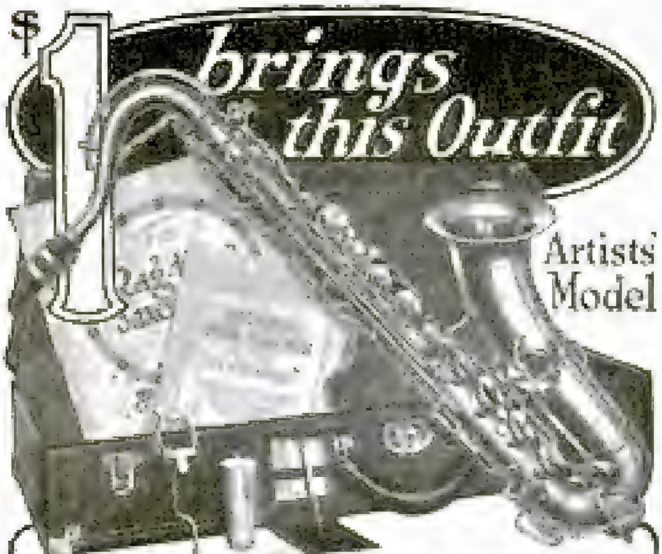

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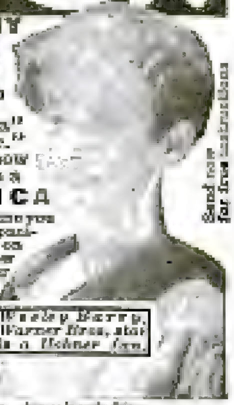

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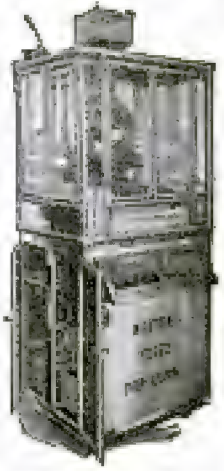

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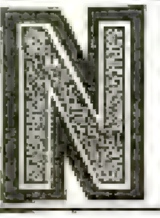

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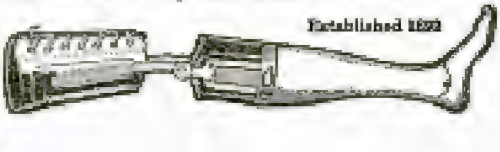

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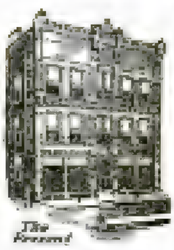

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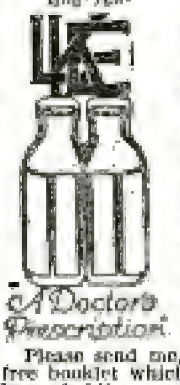

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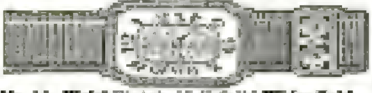

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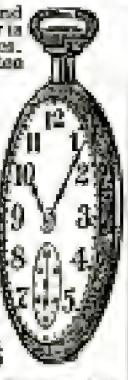

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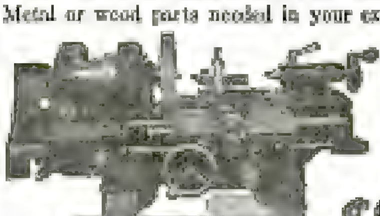

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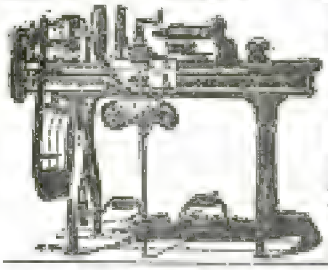

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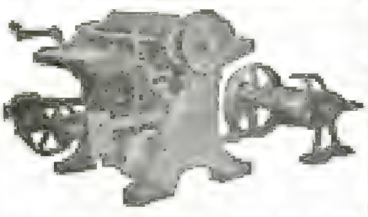

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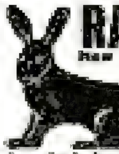

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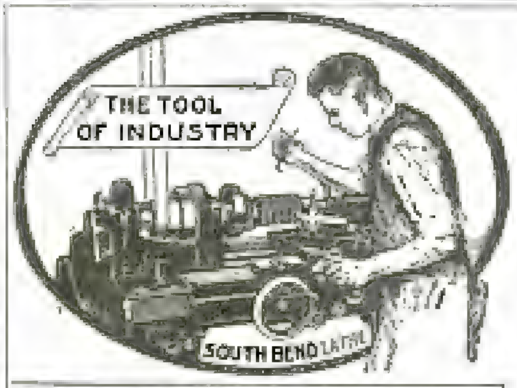

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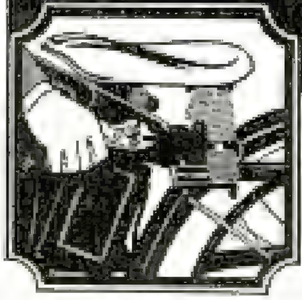

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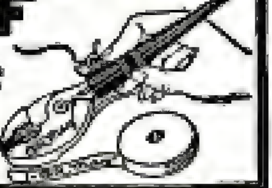

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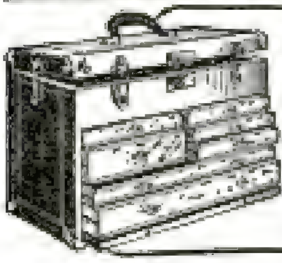

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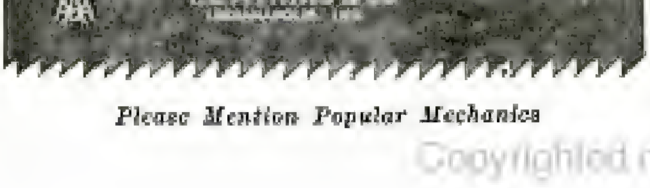

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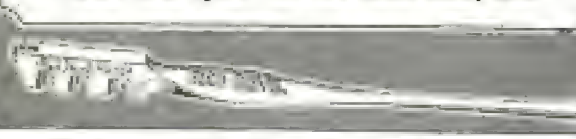

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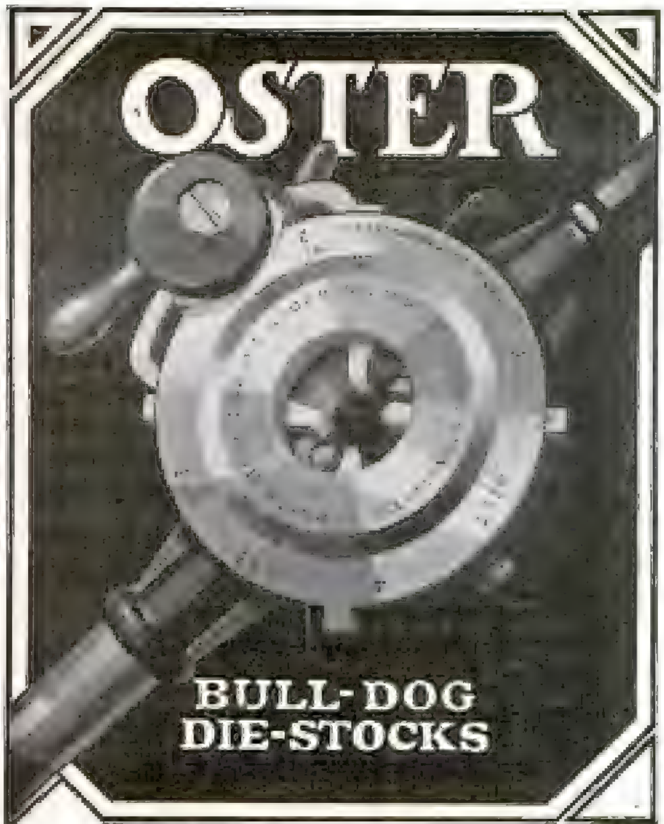

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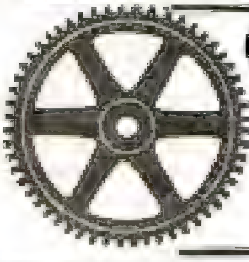

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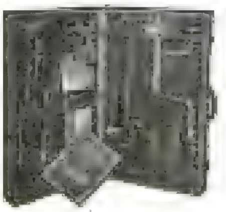

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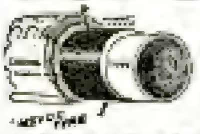

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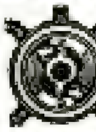

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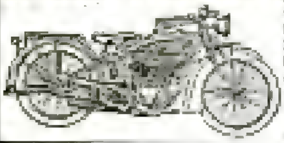

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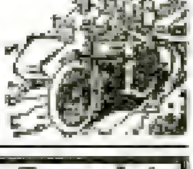

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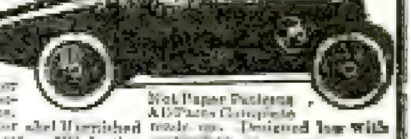

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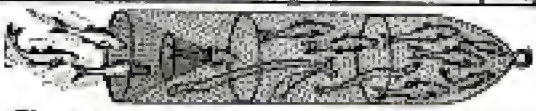

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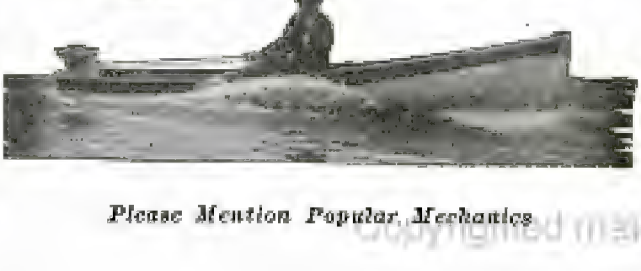

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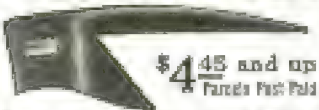

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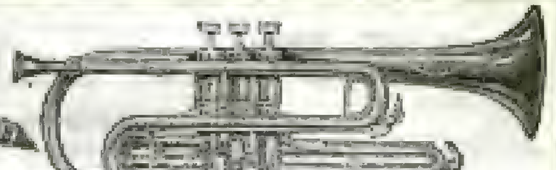

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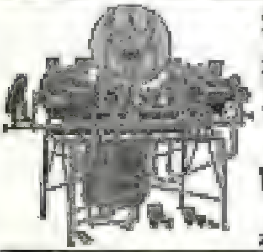

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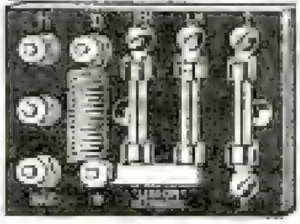

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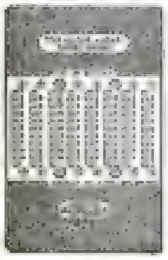

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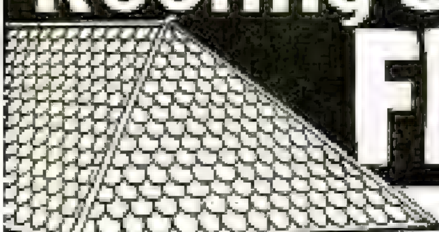

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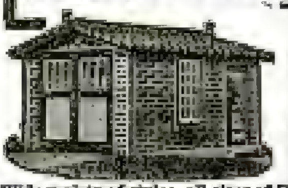

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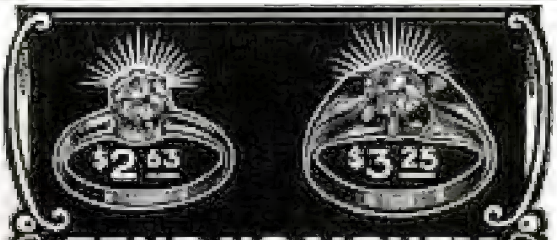

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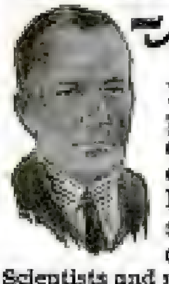

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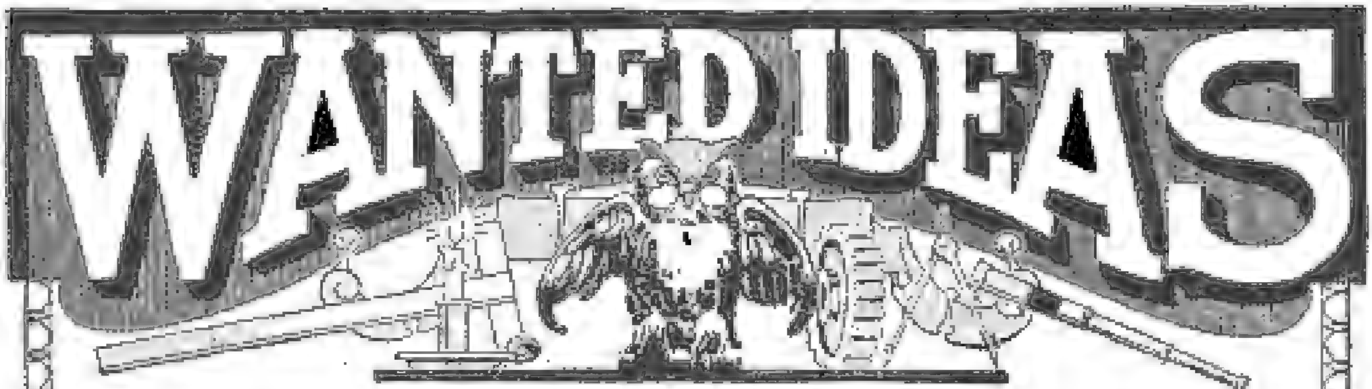

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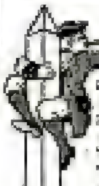

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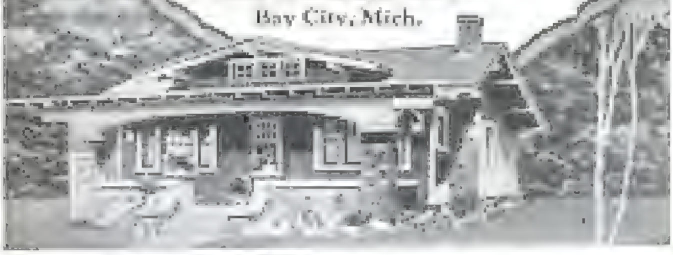

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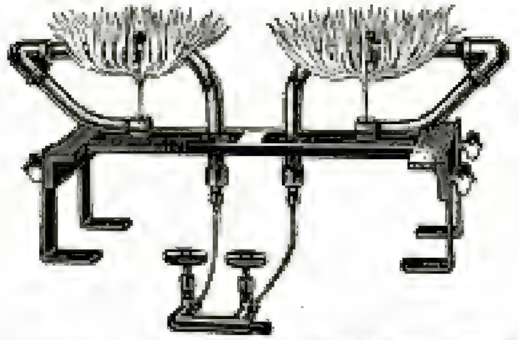

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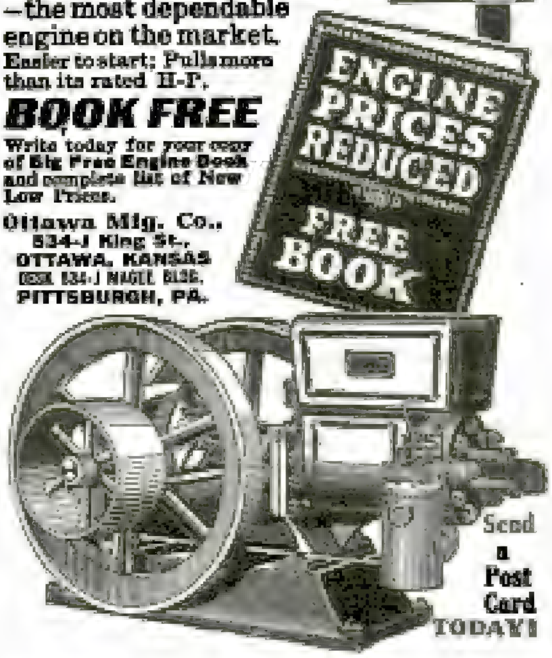

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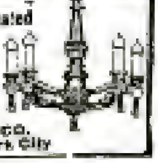

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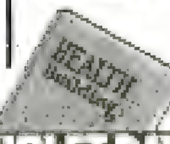

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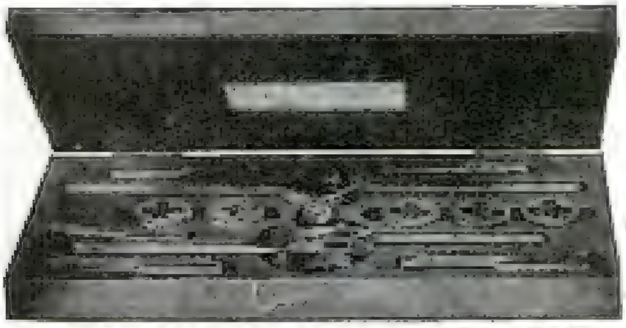

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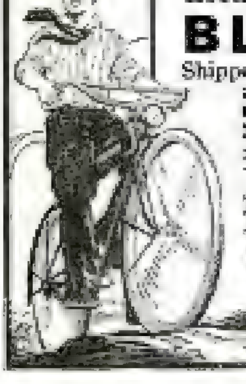

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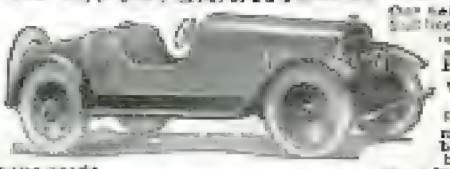

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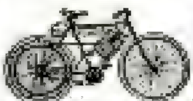

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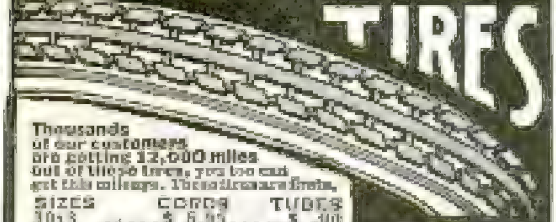

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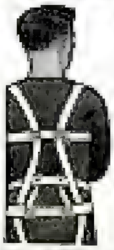

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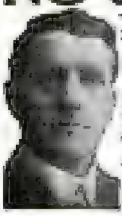

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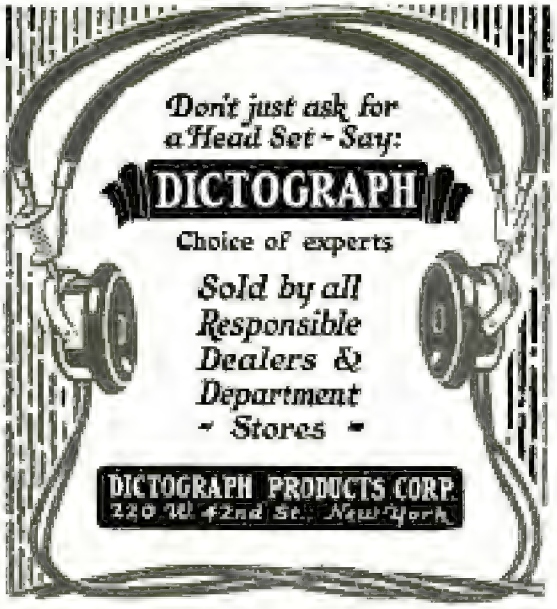

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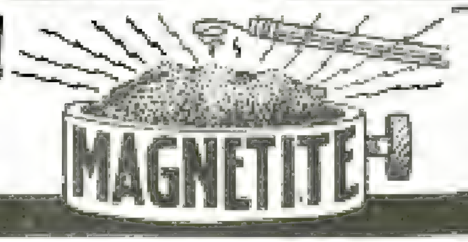

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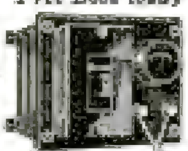

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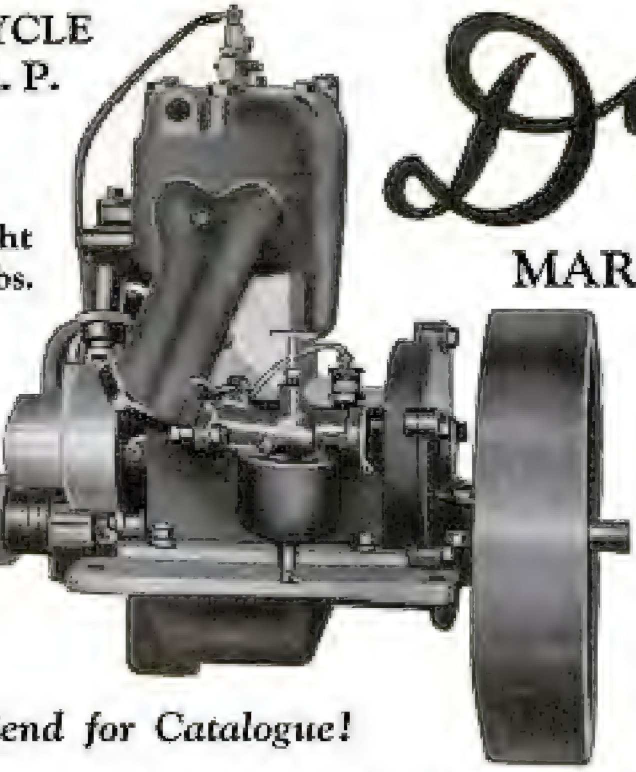

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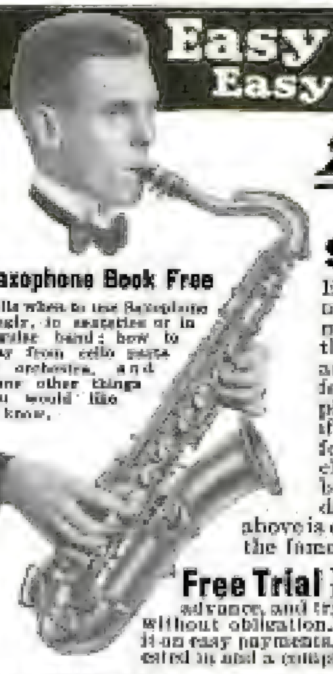

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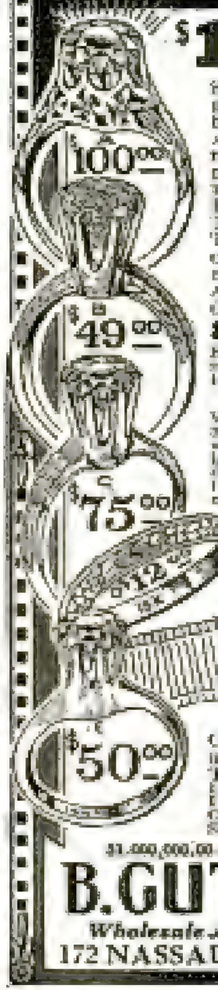

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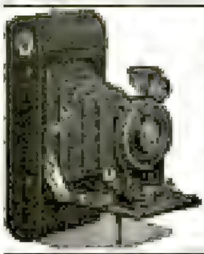

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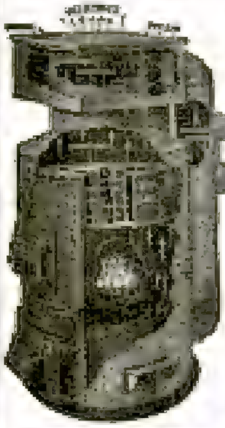

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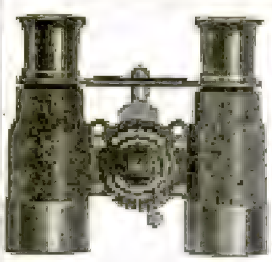

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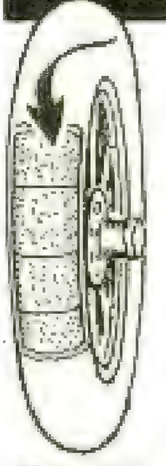

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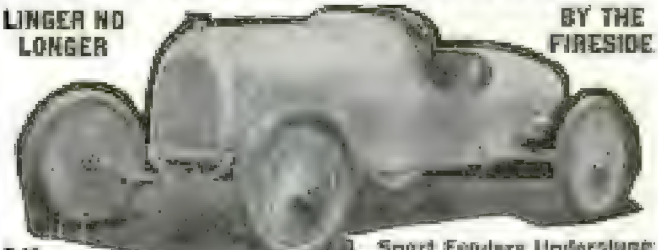

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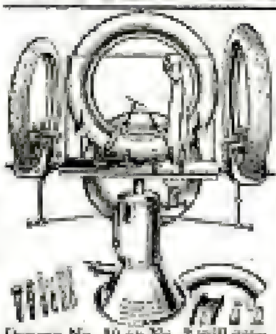

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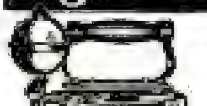

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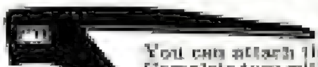

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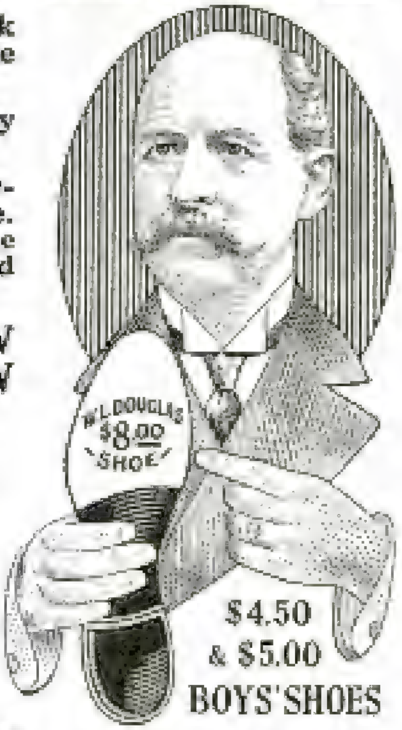

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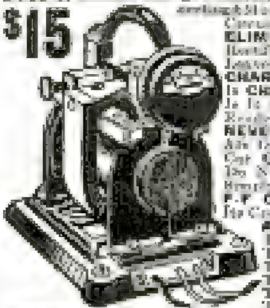

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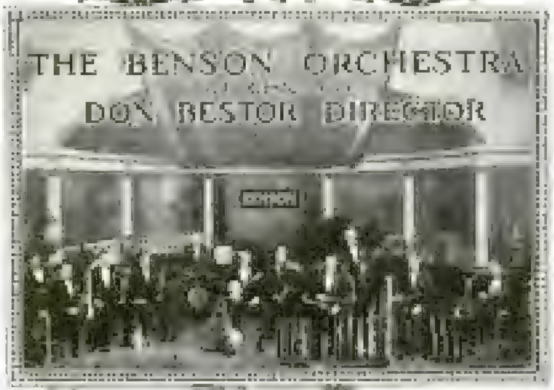

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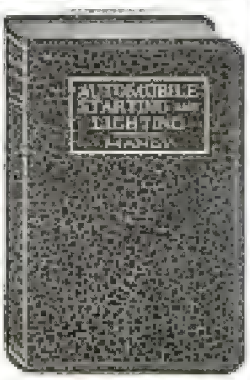

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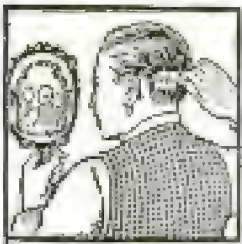

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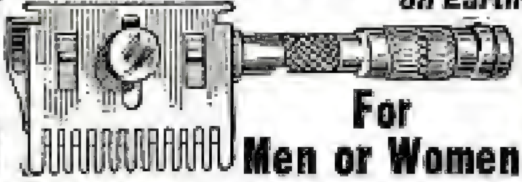

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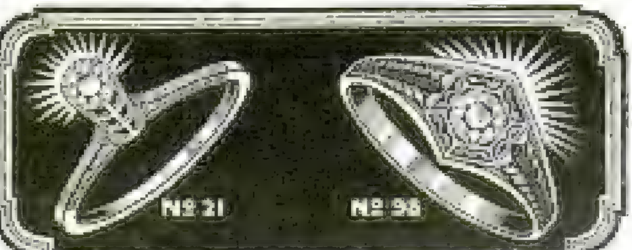

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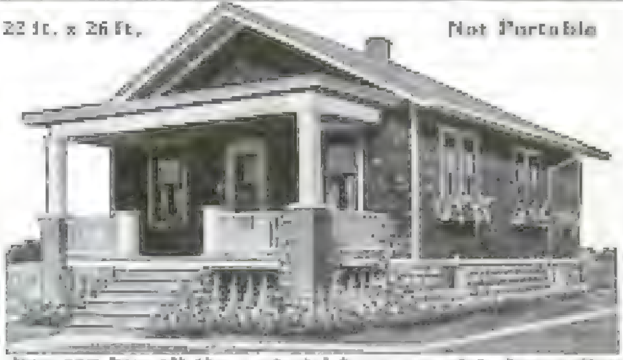

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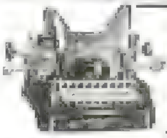

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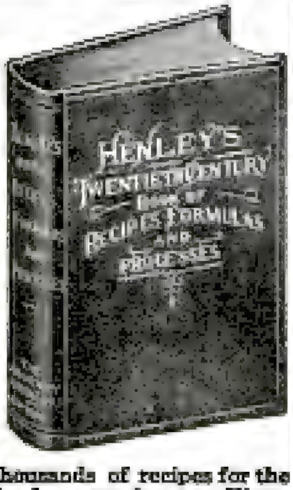

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6. Can be safely pocketed fully lighted!
7. Made of the purest, selected real French briar by the most skilled workmen in France. Mechanically it is a joy to see.
8. Smokes any kind of tobacco.
9. Its patented moisture absorber (removable for cleaning) gives SPORT-BRIAR smokers the purest and coolest smoke in the world.

Money-Back Guarantee

There are always a certain number of "Doubting Thomases" in the world. To them we say—If, after you've tried a SPORT-BRIAR, you wish to return it, we will return your money as fast as Uncle Sam can take it to you. You need state no reasons why. We know, however, that you'll be delighted with your purchase. Everybody is.
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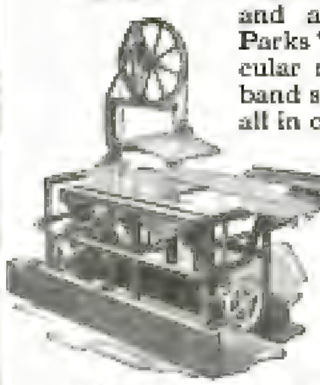

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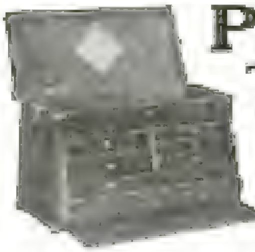
WOODWORKING MACHINES



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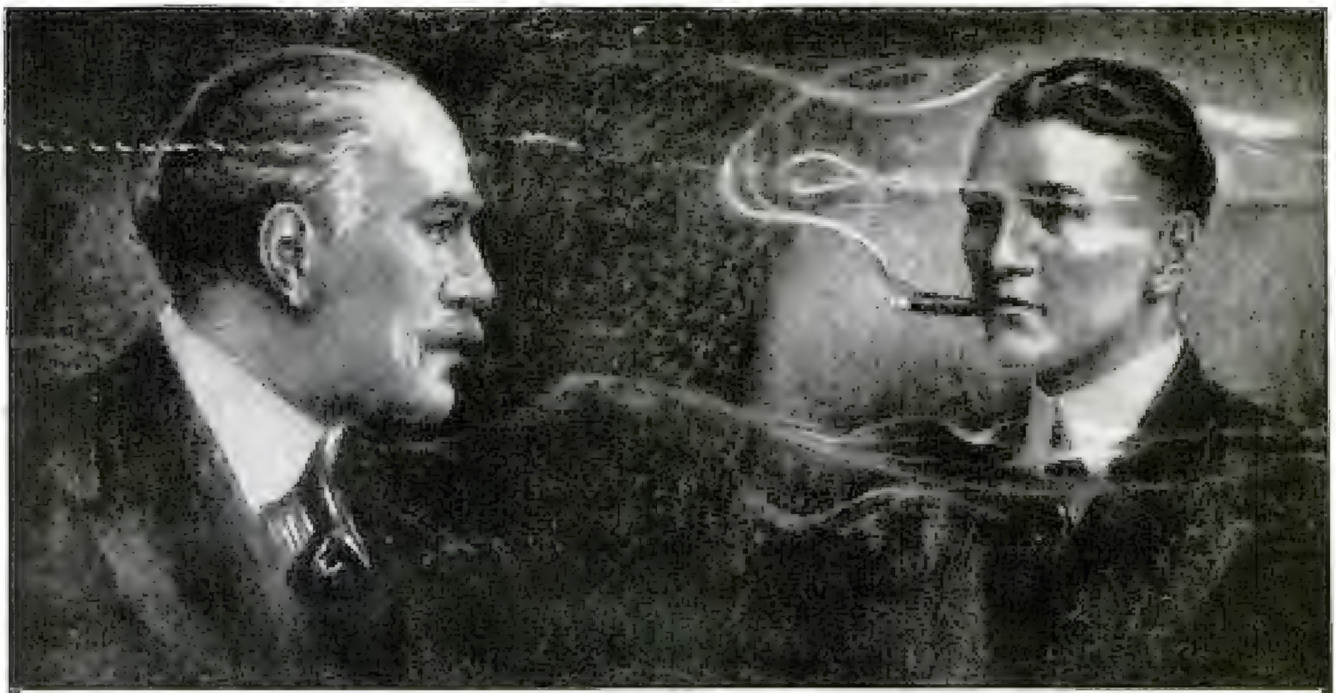

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Look at the facts square in the face, Mr. Tobacco User. You may think tobacco is not hurting you.

That is because you haven't as yet, perhaps, felt the effects of the nicotine poison in YOUR system. For you know that nicotine, as absorbed into the system through smoking and chewing tobacco, is a slow working poison. Slow, yes—but **sure.**

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When your hands begin to tremble—
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then you have a right to suspect that
TOBACCO is getting the upper hand.

Any well-informed doctor will tell you that these are only a few of many symptoms of tobacco poisoning.

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It doesn't make a particle of difference whether you've been a user of tobacco for a single month or 50 years, or how much you use, or in what form you use it—whether you smoke cigars, cigarettes, pipe, chew plug or fine cut or use snuff—**Tobacco Redeemer** will positively remove all craving for tobacco in any form in a very few days. Not the slightest shock to the nervous system. Your tobacco craving will usually begin to decrease after the very first dose—there's no long waiting for results.

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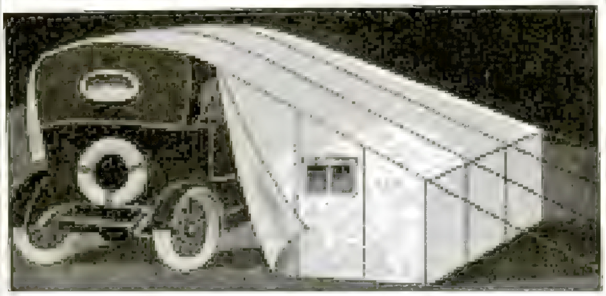

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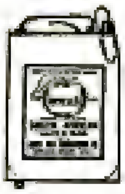

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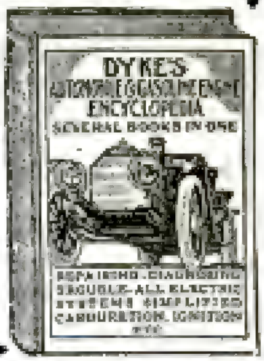

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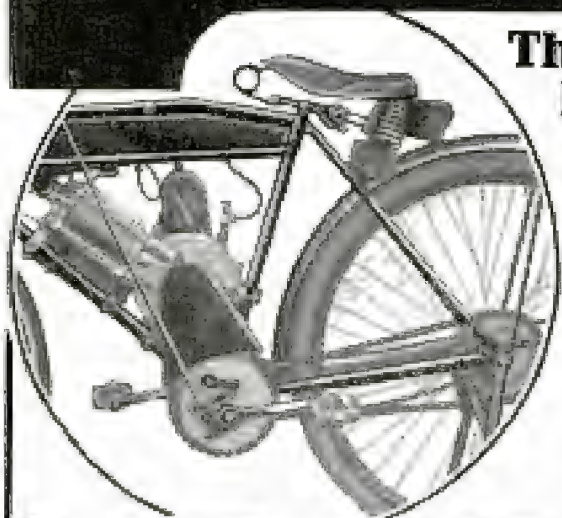

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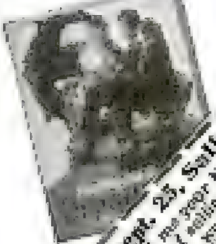

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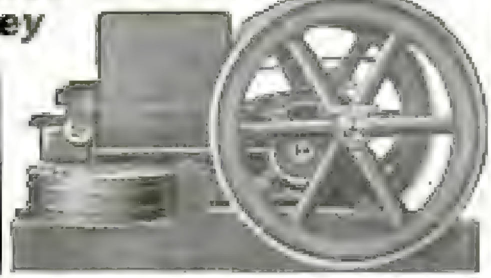

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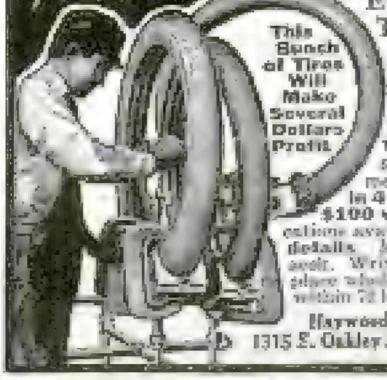

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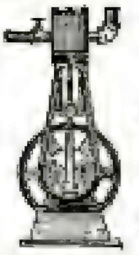

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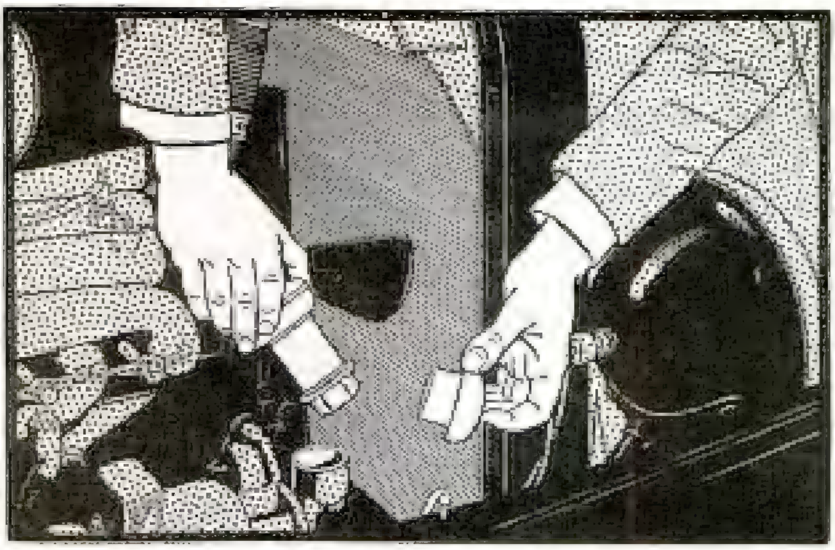

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The Amazing Discovery That Cuts Oil Bills 33⅓% to 50%!

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Here is a new scientific discovery that every man who understands a Ford motor instantly appreciates. It is called AUTOVAC—and it is the invention of P. W. Craig—Motor Specialist.

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At the present time dust and grit-laden air is constantly being drawn into the crank-case of your motor. This grit acts like an emery, grinding out the bearings. AUTOVAC stops this grit from being drawn into the crank-case! Now for the first time you can feed your motor oil that is really CLEAN. And clean oil means an infinitely smoother-running motor—and longer engine life.

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It keeps the terminal wires and fan-belt dry by keeping the oil from contact with them. Thus saving expensive replacement.

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AUTOVAC isn't an untried experiment. It does the work every time. Over 65,000 Ford owners who have subjected it to every sort of test, enthusiastically endorse what it has accomplished.

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Simply fill out and mail to us the coupon below. Send no money—pay the postman nothing. We will send you an AUTOVAC at our expense. Any child can attach it. You simply remove the oil filler plug—insert AUTOVAC instead. It starts saving oil immediately. Your engine instead of being oily and sloppy is kept clean. Your motor gets *clean* oil.

AUTOVAC comes to you at our expense. If it doesn't do everything that we say it will—and more—simply mail it back and you are under no obligation. If after 10 days you are astonished at the results that it has produced, then mail us only $3.50—payment in full. You take no risk. So mail the coupon now.

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1. That Autovac will cut your oil consumption 33⅓ to 50%.
2. Will keep your terminal wires and fan belt dry.
3. By proper lubrication prevent fouling of spark plugs.
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5. Give you clean dirt-free lubrication.
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Price $3.50

AUTOVAC COMPANY, 614 Wallace Building
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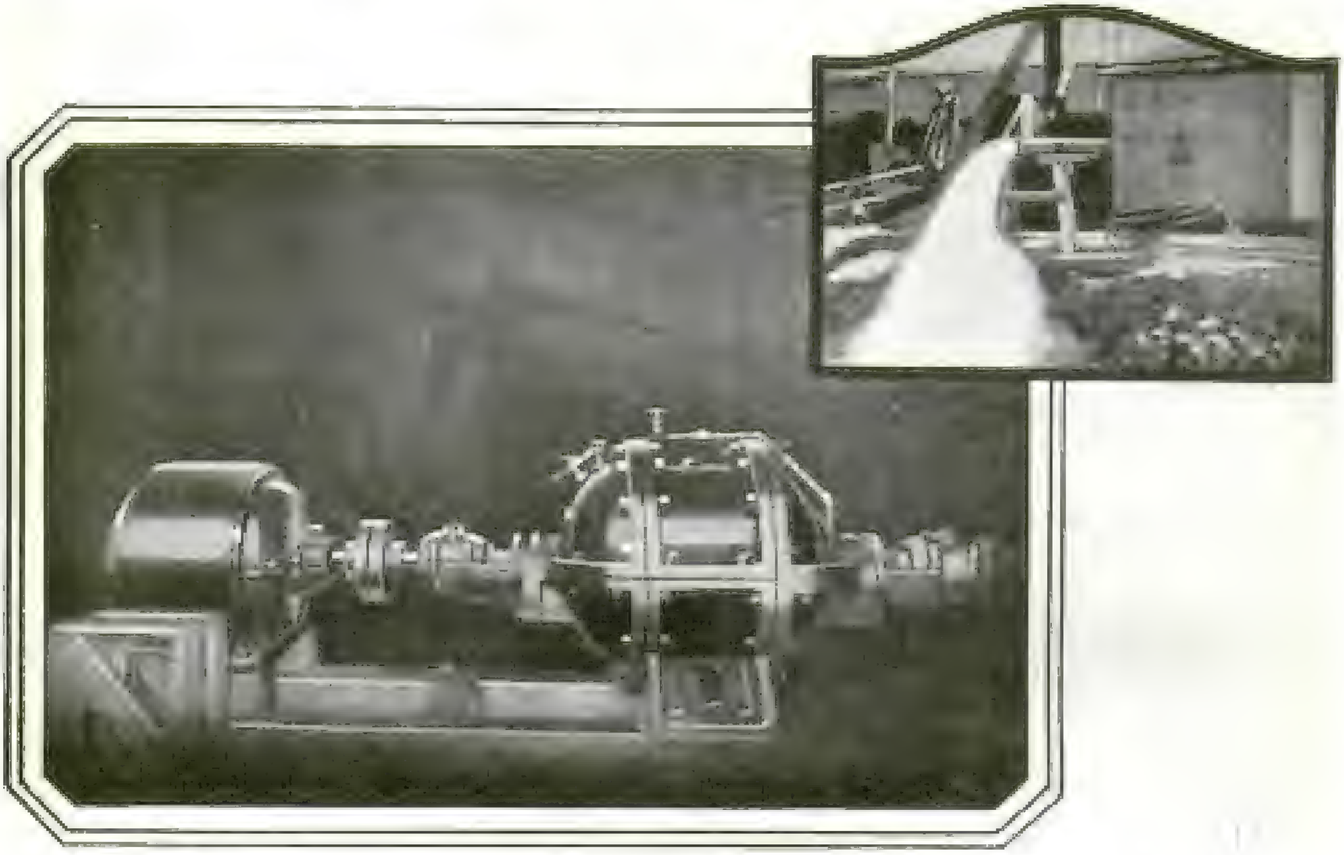

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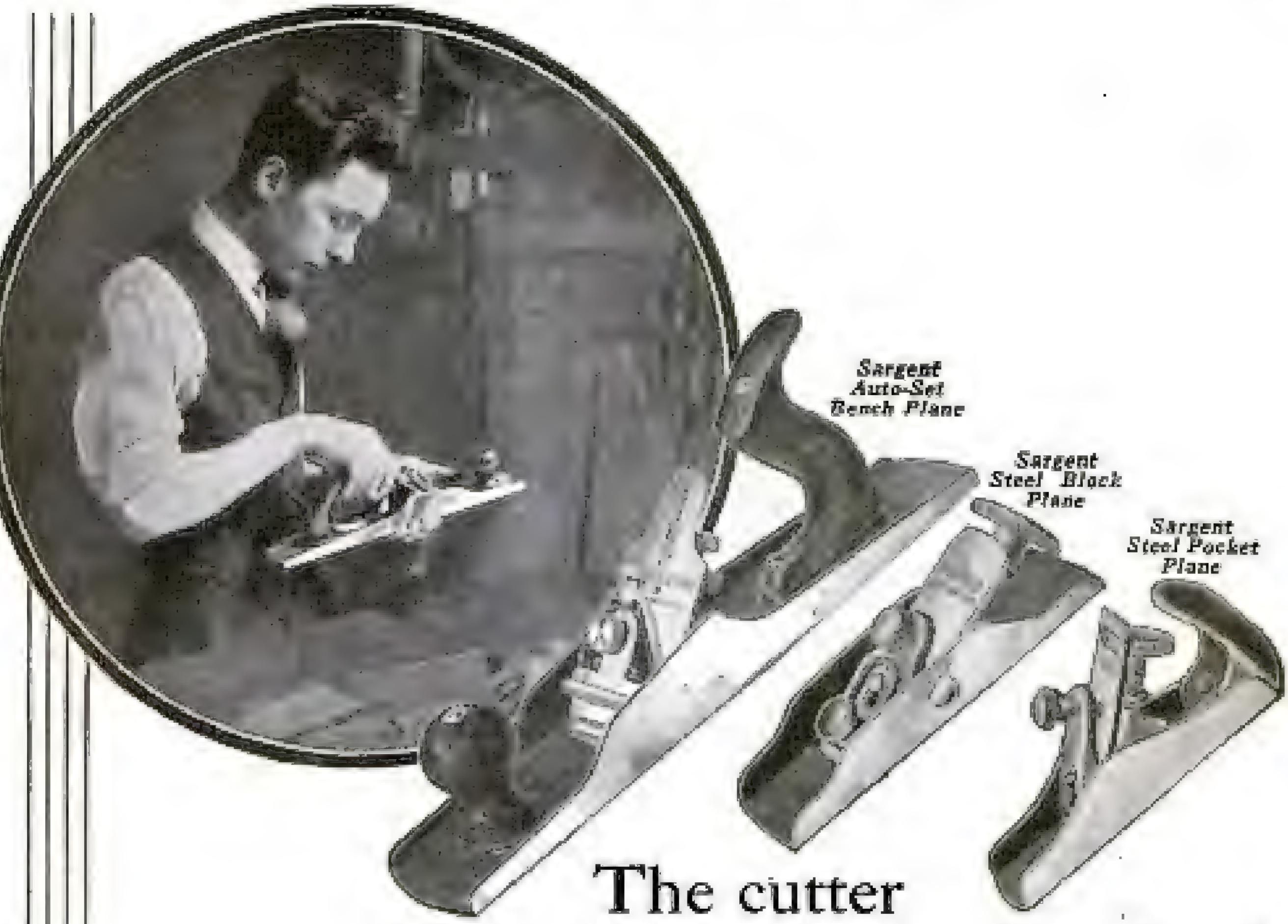

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No More "Greasing Day" in Gasoline Alley

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Complete with fittings and holster. Also used for Chevrolet, Overland, Gray and Star.

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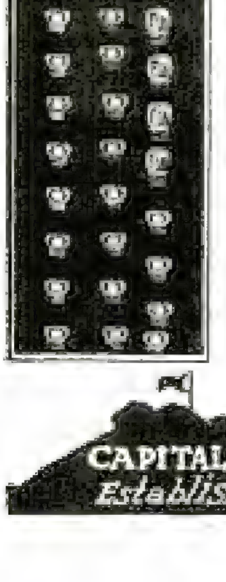

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The largest car requires only 37 fittings. We supply you with 42 fittings standardized and interchangeable. Unscrew the grease cups or oil cups from your car with pliers, and screw in SAAL fittings. No mechanic or expense necessary. The SAAL Heavy Oil System fits all cars, and this is one reason the price is lower than you must pay for other lubricating systems.

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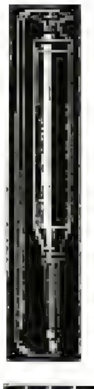

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We supply free steel holster which can be fastened to the dash under the hood, so it's convenient when you stop for gas or before you start out in the morning to shoot heavy oil into every bearing. Takes only a few minutes. Throw away your oil can and get a SAAL!

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Mail coupon for our irresistible offer and sensational profit-making proposition. SAAL Oil Shooter will be the biggest selling auto-accessory in 1923. Get your share of the profits!

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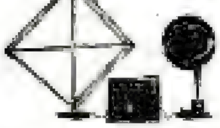

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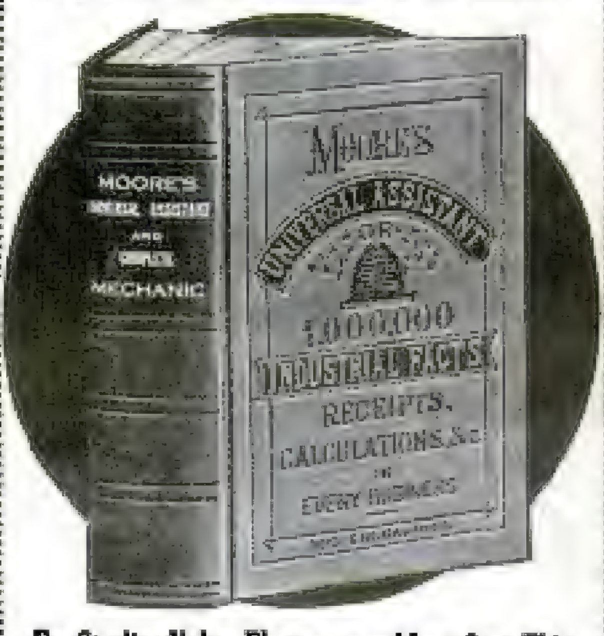

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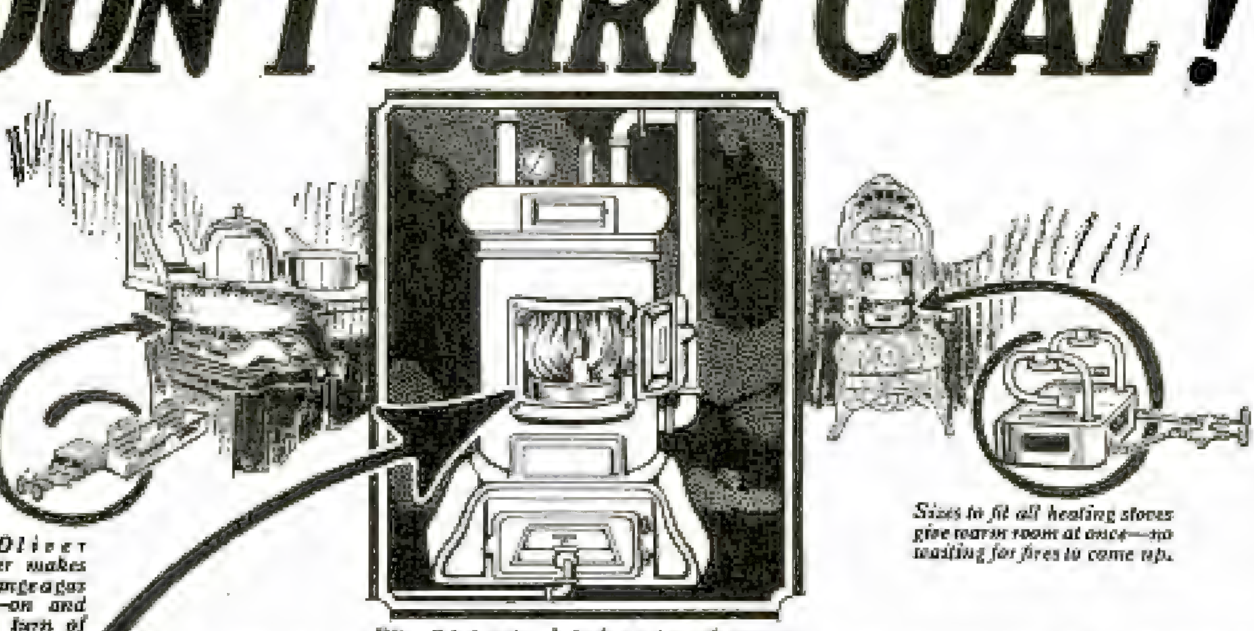

The Oliver Burner makes any range a gas stove—on and off at turn of valve.

Fits all hot water, hot air or steam furnaces.

Sizes to fit all heating stoves give warm room at once—no waiting for fires to come up.

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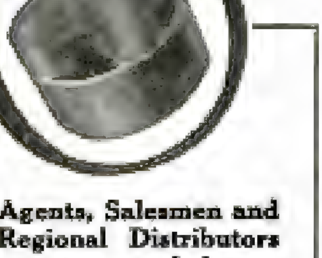

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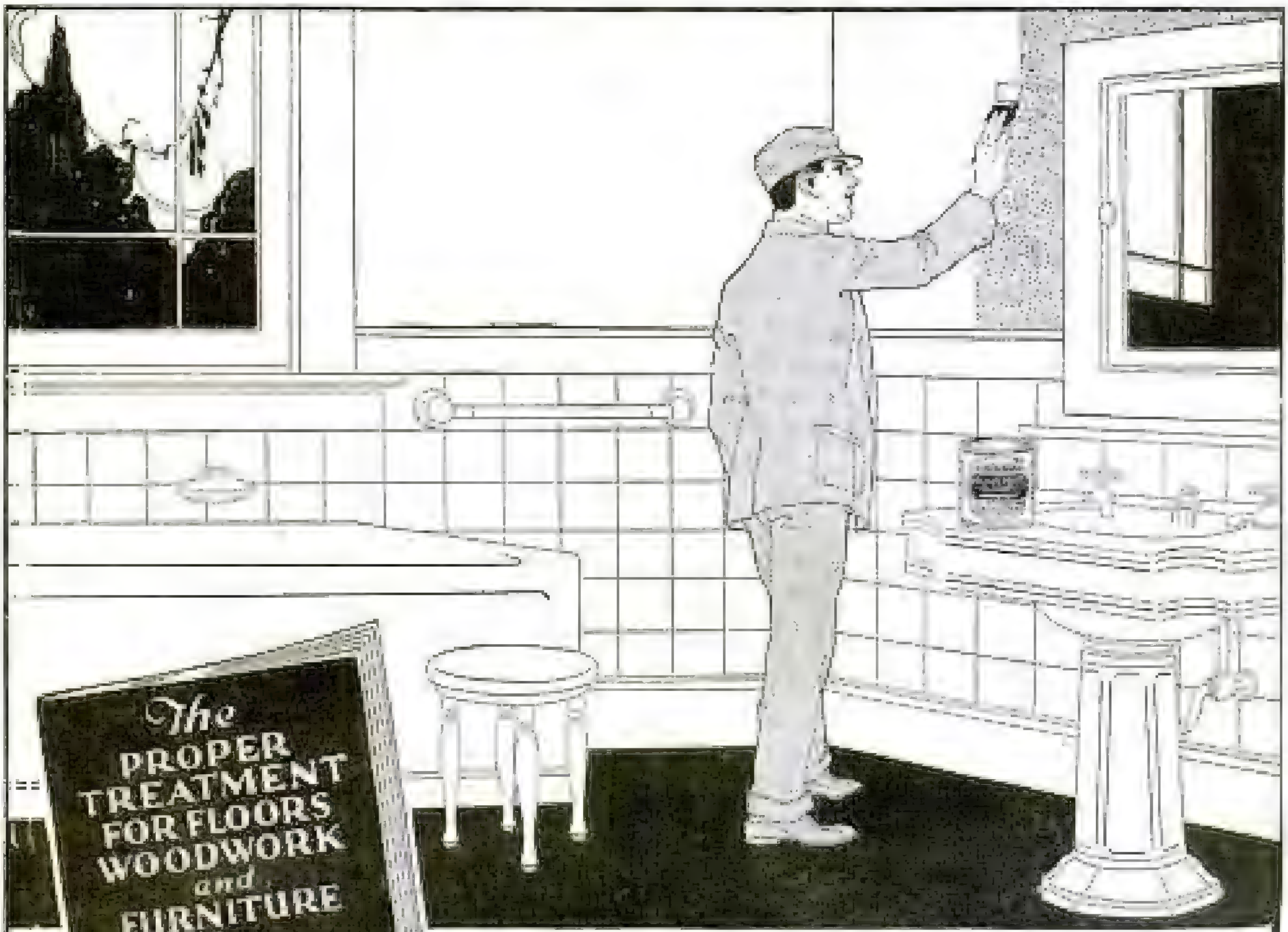

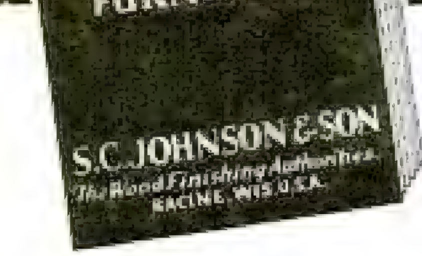

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5 BIG FEATURES

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2. Rolled gold, tight grip, spring clip.
3. Screw pressure filling device fills or cleans in a jiffy.
4. Patent Air-cushion feed-bar prevents leaks and blots.
5. 14-karat tempered, iridium tipped, gold pen made by new secret process.

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Send $3.00 or $3.50, if you prefer the small size slender pen or $4.00 for a medium size pen and $5.00 if you prefer a large pen. **Specify whether long or short models wanted.**

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Style of point preferred

☐ Fine ☐ Medium ☐ Coarse ☐ Med. Stub
☐ Broad Stub ☐ Steno ☐ Posting, in flexible ☐, or stiff ☐ action, long ☐, or short ☐ model.

Name...

Address...

☐ Check here if you want our big money sales plan and agent proposition.

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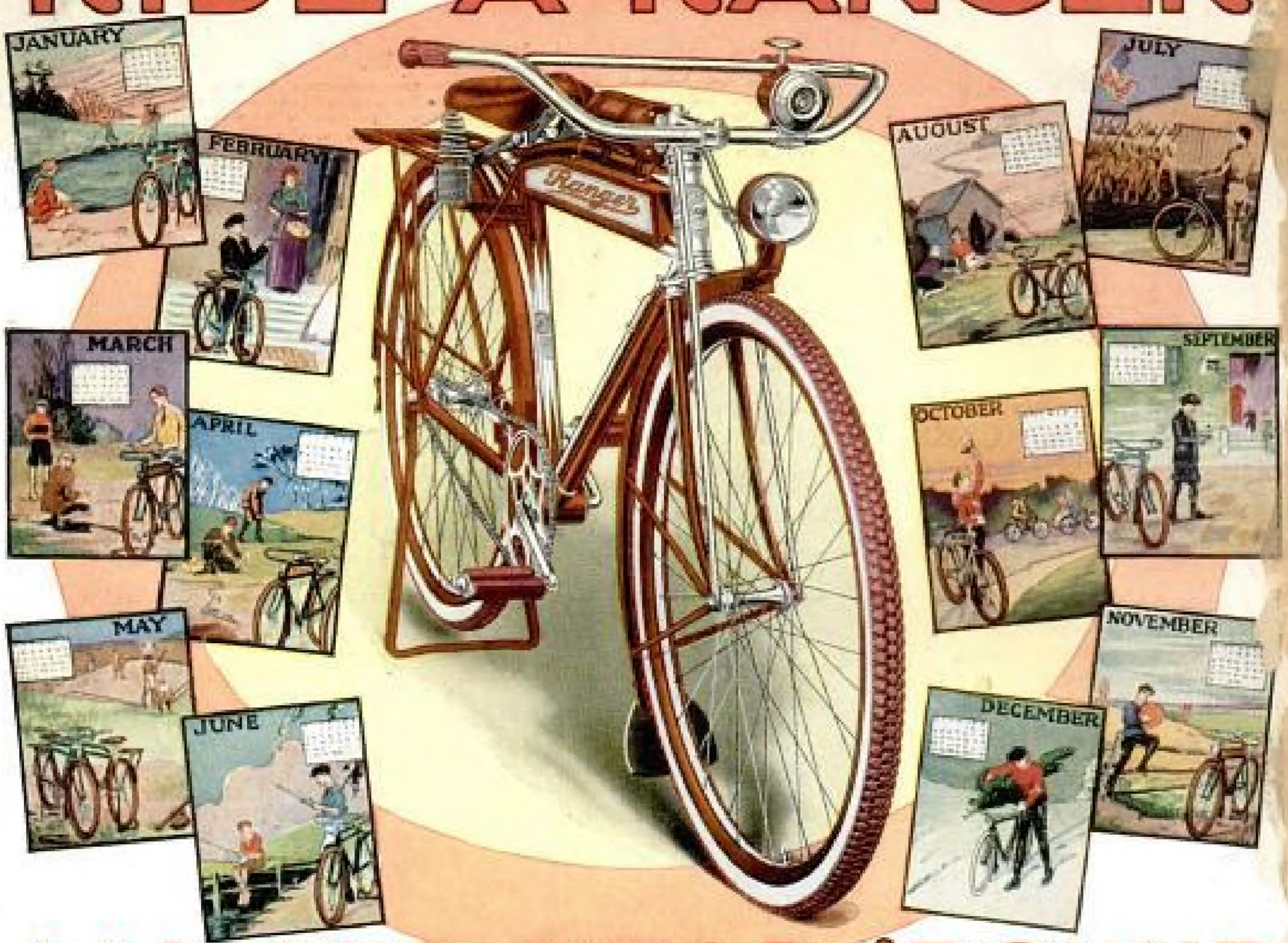
RIDE A RANGER



ALL THE YEAR 'ROUND

30 Days' Free Trial

See for yourself the values found in Ranger bicycles with their complete equipment of accessories and extras. Send to-day for catalog and select the model you prefer. Ride it thirty days, test its speed, sturdy qualities, de luxe equipment and exclusive features. If at the end of thirty days you want to return it for any reason, send it back and you will not be out one cent.

Factory-to-Rider

When you buy a Ranger you are dealing direct with the makers at Factory Prices. Your "Ranger" is waiting for you. The parks, country lanes and swimming holes are calling you out of doors to health and freedom. When we get your order your bicycle will leave on a fast express train (*all charges prepaid*) packed in a waterproof paper bag and enclosed in a strong wooden crate. Safe delivery in perfect condition guaranteed.

There are 44 styles, colors and sizes in the famous line of

RANGER Bicycles

a model to suit every taste and any pocket book.

5-Year Guaranty

Every Mead "Ranger" is warranted for five years. This means we make good trouble arising from any defect in workmanship or material at no cost to you. Our guaranty is a written contract—we are directly responsible for the satisfaction and general performance of your bicycle because we made it.

Pay $5 a Month

If not convenient to pay cash for your "Ranger" bicycle, we will ship it to you at once and arrange with you to accept monthly payments which enables you to take advantage of our rock-bottom factory-to-rider cash price with only a slight amount added to cover the cost of extra bookkeeping on credit accounts. Parents frequently advance the initial small payment and energetic boys and girls save and earn the later monthly payments.

Tires and Equipment

Our big free catalog illustrates and describes parts, equipment and sundries that our more than a million riders may need. All are carefully selected from the leading parts makers of the world, to Save You Money at our Factory Prices.

MEAD CYCLE COMPANY
Dept. T-108, Chicago, U. S. A.

Send me the new Ranger Catalogue, factory-to-rider wholesale prices, 30-day Free Trial Offer and Easy Payment Terms.

Name..
R. F. D. or
Street No. ....

Town.............................. State..............................

FACTORY DISTRIBUTORS IN 264 CITIES

The nearest city (with a population of 25,000 or more) which I can conveniently visit to select a Mead Ranger is..................................
If you have a Special Factory Distributor there, send me letter of introduction to him so I can inspect the Rangers and take delivery from there at Factory prices or on Easy Payment Plan if I prefer.

Get this FREE Catalog

We have a copy all ready for you and it will be sent as soon as we receive the coupon in the lower corner of this page. If you prefer send a postcard—only write your name and address plainly. Turning the pages of the "Ranger" catalog is like walking down the aisles of the largest and greatest of bicycle stores seeing bargains, new ideas and conveniences that you never saw or heard of before.

$5.00 FREE Premium Set With your Ranger

Send No Money Ask for the big catalog and full particulars of our Factory Prices, marvelous offers and Easy Payment terms. Read especially about our extra $5.00 FREE Premium set which goes with every "Ranger" bicycle.

MEAD CYCLE COMPANY

DEPT. T-108 CHICAGO, U. S. A.

POPULAR MECHANICS MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

REG'D. TRADE MARK, GREAT BRITAIN, No. 410426 REG. U. S. PAT. OFF.

SEE PAGE 511

It takes *only* 8 weeks to get a big job

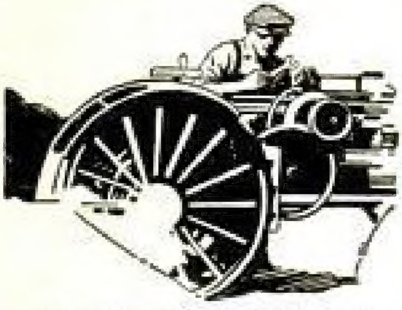
O. H. Justus owns a big agency and repair shop at Parkersburg, W. Va. He says "that my schools give motor secrets that will put any man 'on easy street.'"

In the Auto and Tractor Business

Read what these men are doing—here is your big chance to get "on easy street." Come to these great shops on the biggest FREE offer ever made.

Big Firms Need Trained Men

The Auto and Tractor Business is on the boom. Thousands of trained men will be needed during the next few months. I get calls every day from Garages, Battery Stations, Auto Repair, Welding Shops and other successful concerns for Rahe men. When the big fellows need high grade men they know where to come for them. They want Rahe trained men.



Emanuel Rushfeldt, Alberta, says: "Earning $10 a day and only 20 years old."

My Training Unusual

Scientific tool training—that's the secret. You do things here according to the latest engineering standards. Thousands of dollars have been spent in modern tools and equipment. That's why my men are at home in the biggest shops in the country. If you want to succeed the way Beimer and Justus and the rest have—qualify by the same method in only eight weeks or stay as long as you like.

I'll Pay Your Railroad Fare and Board You

In order to fill the openings that now exist, I am making an offer no one has ever made before—**Free Railroad Fare, Free Board for eight weeks.**

SAVE $50 to $75

You Save Big Money by acting now. Pack your grip—get on a train—Come to school right now before it is too late—**OR WRITE TODAY.**

W. W. Peace gets $250 a month and expenses operating a tractor in the oil fields.

Send for FREE Book

My big illustrated training book tells how others are succeeding. It tells many things you ought to know about Autos and Tractors. Write for it and my **short time offer** NOW. It soon expires.

Rahe Auto & Tractor Schools

CHICAGO 4445 Grand Blvd. — **Dept. 902** — **CINCINNATI** Ninth and Walnut

Louis Beimer at 24 was made foreman over men many years older. That's not luck—*it's Rahe training.*

Rahe Auto & Tractor Schools,
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Without any obligation, send me your big free book, "The Evolution of Transportation." Also information regarding special temporary offer.

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City.............................State.............

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